



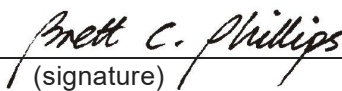
Flood Impact Risk Assessment, 10 Dangar Street, Wickham

Prepared for UPG Wickham Pty Ltd

Reference no. 300204409 | 7 April 2026

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Executive Summary

This Flood Impact Risk Assessment is submitted to the Department of Planning, Housing and Infrastructure (DPHI) on behalf UPG Wickham Pty Ltd (UPG) (the Applicant), to support a State Significant Development Application (SSDA) and concurrent Rezoning Report for the construction of a 43-storey mixed-use development at 10 Dangar Street, Wickham (the site). The site is located within the Newcastle local government area (LGA) and occupies a prominent corner position immediately north of the Newcastle Interchange.

To facilitate the proposed development described in Section 1.4.2, a concurrent Rezoning Proposal is sought to make the following amendments to the *Newcastle Local Environmental Plan 2012* (Newcastle LEP 2012) in relation to the site:

- Amend Clause 7.9 to permit a maximum building height of RL 152m on the site; and,
- Amend the Clause 7.9A to permit a maximum FSR of 14.4:1 on the site.

The proposed amendments to the Newcastle LEP 2012, as outlined above, will facilitate the following development, proposed via a concurrent SSDA. Specifically, the proposed works sought under the SSDA include:

- Construction of a 43-storey (+ plant) mixed-use tower, comprising:
 - 245 residential apartments
 - 99 co-living units
 - Ground floor retail premises, to all three street frontages
 - A hotel component within the podium
 - Basement car parking
- Associated landscaping and public domain improvements, including the provision of a pedestrian through-site link that runs east/west adjacent to the Newcastle Interchange.

It is noted that the project will commit to providing 15% of the residential GFA as affordable housing for a minimum of 15 years, to be managed by a registered Community Housing Provider (CHP).

The proposed SSDA will seek consent for the use of basement structures and enabling works approved under DA2018/01197 (as modified).

For a detailed description of the proposed development, refer to the EIS prepared by Beam Planning, and the Architectural Drawings prepared by SJB Architecture.

The purpose of this report is to assess the impact of the development proposed under SSD-89869959 in accordance with the Flooding requirements set out in the Secretary's Environmental Assessment Requirements (SEARs) issued by DPHI on 26 September 2025.

This FIRA report addresses the relevant SEARs, which were issued on 26 September 2025 in relation to the project, as set out in **Table 1**.



Previous Flood Studies

Previous studies of flooding of the Cottage Creek floodplain include the following:

- 2012 Newcastle City-wide Floodplain Risk Management Study and Plan
- 2017 Williamstown Salt Ash Floodplain Risk Management Study & Plan
- 2024 Lower Hunter Floodplain Cumulative Development Impact Study and Plan – Stage 2
- 2024 Throsby, Styx & Cottage Creek Flood Study

Flood Risk Assessment

As outlined in Section 2.2, a new Flood Information Certificate was obtained from Newcastle City Council on 21 August 2025 (FL2025/00243). A copy of this certificate is appended as **Appendix D**.

The 2025 certificate describes both “Ocean Flooding” and “Local Catchment Flooding”.

Ocean Flooding flood levels, velocities and flood hazard and risk categories are reported to be based on the 2012 Newcastle City-wide Floodplain Risk Management Study (BMT WBM, 2012).

In order to assess the impacts of proposed development under ocean flooding conditions a request was submitted to Newcastle City Council to be provided copies of the 2012 model and results files. On 20 November 2025 Newcastle City Council advised that it was “*unable to provide the 2012 City Wide FRMS&P model and data files*”. Consequently an assessment of the impact of the proposed development under Council’s adopted ocean flooding conditions was unable to be undertaken.

Local catchment flood levels, velocities and flood hazard and risk categories are reported to be based on the 2024 Throsby, Styx and Cottage Creek Flood Study

In order to assess the impacts of proposed development under local catchment flooding conditions a request was also submitted to Newcastle City Council and copies of the 2024 model and results files were provided. Consequently an assessment of the impact of the proposed development under Council’s adopted local catchment flooding conditions has been undertaken.

The floodplain model assembled for the 2024 Throsby, Styx and Cottage Creek Flood Study was adopted for the assessment of Benchmark Conditions.

The estimated flood extents and levels, depths, velocities and hazards in the 5% AEP, 1% AEP, 1% AEP in 2020, 1% AEP in 2100 and PMF events under Benchmark conditions are mapped in the Figures attached in **Appendix A**.

Flood Impact Assessment

Future Conditions

The assessment of flooding under Future Conditions was undertaken by modifying the TUFLOW model of Benchmark Conditions to represent the planned development as summarised in **Section 4.1** and in selected drawings attached in **Appendix E**.

The estimated flood extents and levels, depths, velocities and hazards in the 5% AEP, 1% AEP, 1% AEP in 2020, 1% AEP in 2100 and PMF events under Future Conditions are attached in **Appendix B**.



Flood Impact Assessment

Flood Level Impacts

The estimated impacts of the proposed development on the 5% AEP, 1% AEP, 1% AEP in 2050, 1% AEP in 2100 flood levels and the PMF levels (in comparison to Benchmark Conditions) are plotted respectively in **Figures I1, I4, I7, I10 and I13** in **Appendix C**.

It is concluded that:

- In the 5% AEP, 1% AEP, 1% AEP in 2050, 1% AEP in 2100 the flood level impacts are negligible;
- In the PMF there is a small area on the southern boundary where the PMF level increases by around 0.05 m;
- Overall the proposed development has a negligible adverse impact on flood levels.

Flood Velocity Impacts

The estimated impacts of the proposed development on the 5% AEP, 1% AEP, 1% AEP in 2050, 1% AEP in 2100 flood velocities and the PMF velocities (in comparison to Benchmark Conditions) are plotted respectively in **Figures I2, I5, I8, I11 and I14** in **Appendix C**.

It is concluded that:

- In the 5% AEP, 1% AEP, 1% AEP in 2050, 1% AEP in 2100 there are some scattered small impacts on flood velocities which are considered to have a negligible impact;
- In the PMF there is a small area south of the southwest corner of the subject property where the PMF velocities increases but remain below 1.5 m/s and therefore are not a scour concern;
- Overall the proposed development has a negligible adverse impact on flood velocities.

Flood Hazard Impacts

The estimated impacts of the proposed development on the 5% AEP, 1% AEP, 1% AEP in 2050, 1% AEP in 2100 flood hazards and the PMF hazards (in comparison to flood hazards under Benchmark Conditions) are plotted respectively in **Figures I3, I6, I9, I12 and I15** in **Appendix C**.

It is concluded that:

- In the 5% AEP, 1% AEP, 1% AEP in 2050, 1% AEP in 2100 there are some scattered small changes in the flood hazard which are considered to have a negligible impact;
- In the PMF there is scattered impacts on flood hazard where the local extent of a flood hazard category has changed by one grid cell which does not significantly change the hazards experience on the floodplain in the vicinity of the subject property;
- Overall the proposed development has a negligible adverse impact on flood hazards.

Flood Storage

The estimated flood storage under pre-development (Benchmark) Conditions in the 1% AEP flood in 2050 is mapped in **Figure 10**. The estimated flood storage under Benchmark Conditions in the 1% AEP in 2050 flood is 571 m³.



Based on the previous approved development which did not include provision for flood storage within the building footprint, the impacts on flooding including flood levels, velocities, hazards and storage of the proposed development without any flood storage (except for inundation of the loading dock area which provides around 80 m³ in the % AEP in 2050 flood) are described in Section 4.2.1, 4.2.2 and 4.2.3. It was concluded that the proposed development without any flood storage except for the loading dock has a negligible adverse impact on flood levels, velocities and hazards.

Emergency Planning

The hierarchy of plans which guide the planning for floods in NSW are overviewed and include:

- 2023 NSW State Emergency Management Plan
- 2024 NSW State Flood Plan
- 2021 Hunter-Central Coast Regional Emergency Management Plan
- 2022 City of Newcastle Flood Emergency Sub Plan

Council's website includes a range resources to prepare for emergencies and natural hazards which are overviewed in **Section 5.5**.

Flood Emergency Response

Flood Risks

Flood Levels, Velocities and Hazard Categories

The estimated flood extents and levels, flood depths, flood velocities and flood hazards under Future Conditions are described in **Section 4.1** and are mapped in the Figures attached in **Appendix B**.

Rate of Rise of Floodwaters

While the driveway crest level is set at the 1% AEP flood level + 500 mm freeboard and is compliant, this freeboard would be overwhelmed in a PMF event. The 4 hour PMF is estimated to reach a level of 3.3 m AHD ie. 0.5 m higher than the driveway crest level.

Based on the representative spill level of 2.80 m AHD to initiate flow down the driveway (assuming that the ingress of floodwaters via any other vents or lift shafts is limited) it is estimated that in a 4 hour PMF event that the onset of flows down the car park ramps would occur around 2 hours 15 minutes after start of the PMP storm.

The rates of filling of each level of the basement car parking was estimated using a simple hydraulic model of flows down the access ramps. For the case of the 4 hour PMF, the estimated times it would take to fill each level of the car park to a depth of 0.9 m and to a depth of 2.5 m is summarised in **Table 4**.



In events less extreme than the PMF but of sufficient severity to overtop the driveway crest level and where the inflow volume is less than the storage volume in the car parking levels then the same flooding behaviour would be expected with flooding initially occurring on all three levels but at the time inflows cease floodwaters would then continue to flow down the access ramps until the flood level in the car park reaches its maximum level (ie. the basement levels would fill progressively from Basement 03 like a bath tub).

Pedestrian and Vehicular Safety

The latest edition of Australian Rainfall and Runoff released in 2019 provides guidance on both pedestrian and vehicle stability in floods as does the 2023 Flood Risk Management Guideline FB03 released on 30 June 2023 by NSW DPE.

The 2023 Flood Risk Management Guideline FB03 released on 30 June 2023 by NSW DPE includes a plot of thresholds for the stability of people in floods (see **Figure 12**) and a plot of thresholds for vehicle stability in floods (see **Figure 13**).

Under overland flow flood conditions in the 1% AEP in 2050, PMF 4 hour and PMF 6 hour events the following results are plotted at reference locations H2, H3, H4, H5, H6 and H7 and attached in **Appendix F**:

- (i) The variation in flood depths;
- (ii) The variation in flood hazard in comparison to flood hazard categories (refer to **Figure 8**);
- (iii) The variation in flood hazard in comparison to pedestrian stability limits.

Indicative Onset and Duration of Unsafe Conditions

The indicative durations of unsafe conditions for small vehicles, large vehicles, children and adults are summarised in **Table 5** while the elapsed time to reach unsafe conditions are summarised in **Table 6**.

It is noted that the Hannell Street frontage of the property (Locations H4 and H5) and Hannell Street either do not experience unsafe conditions or if unsafe conditions are experienced they are for a shorter period of time compared to conditions at Locations H3, H2 or H7. Consequently any emergency access to the development during major and extreme floods should be via Hannell St.

Flood Warning

Council provides a Flood Alert Service which requires any interested person or organisation to sign up to be notified in case of an emergency. Visit: [Flooding - City of Newcastle](#)

Other sources of information regarding approaching severe weather conditions which could cause potential flooding at the site including:

- The Bureau of Meteorology through their website (www.bom.gov.au);
- The Hazards Near Me app ([Hazards Near Me app | NSW Government](#));
- Observation of local rainfall;
- The NSW SES ([Homepage | NSW SES](#));



- City of Newcastle Disaster Dashboard ([Disaster Dashboard](#));
- Local television stations; and/or
- Local radio stations.

An important indication of likely imminent flood activity would be intense local rainfall and residents; retail workers and visitors should take notice of extreme rainfall warnings issued by the Bureau of Meteorology and disseminated by local media.

Council provides a list of emergency contacts at: [Emergency Contacts - City of Newcastle](#)

Flood Refuge and Evacuation

The designated flood refuge is the hotel amenity facilities on Level 06. There is 1,019 m² of GFA on this level. UPG have estimated that up to 55 persons may be present in retail spaces on the ground floor. This would require an available refuge area of 55 x 2 m² per person = 110 m². It is concluded that the hotel amenity facilities offer an ample area for flood refuge.

Vertical evacuation (shelter-in-place) is proposed for this building. All hotel staff, hotel guests, other workers, residents and visitors located on Level 1 or higher should remain in place unless directed to evacuate by NSW SES.

In the event that lifts cease to operate (for safety reasons or due to loss of power during a major storm) the central stairs provide an evacuation route from the basement levels up to Level 06.

All retail areas on the ground floor and the Residential Lobby have back-of house access to the central stairs. Any persons evacuating from the Co-living Lobby or the Hotel Lobby can access the central stairs by first walking up to the Mezzanine Level.

Flood Emergency Response Plan (FERP)

In 2022 Epicentre Consulting Engineers prepared a Flood Emergency Response Plan (FERP) for the mixed-use development at 10 Dangar Street, Wickham (Lot 1 DP1197377) (see **Appendix G**).

If required an updated Flood Emergency Response Plan could be prepared prior to issue of a CC.

Compliance Assessment

This FIRA addresses the flooding considerations identified in Section 5.21 Flood Planning of the Newcastle LEP 2009 as set out in **Table 7**.

This FIRA also addresses the flooding considerations identified in Section 5.22 Special Flood Considerations of the Newcastle LEP 2012 as set out in **Table 8**.

The assessment of compliance with the Newcastle DCP 2023, which has been based on proposed flood mitigation measures incorporated into the development and the resulting flood impacts which are described in **Section 4.2**, is set out in **Table 9**.

It is concluded that the proposed development complies with the flooding requirements of the Newcastle LEP 2012 and the intent of the Newcastle DCP 2023.



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1 Introduction

This Flood Impact Risk Assessment is submitted to the Department of Planning, Housing and Infrastructure (DPHI) on behalf UPG Wickham Pty Ltd (UPG) (the Applicant), to support a State Significant Development Application (SSDA) and concurrent Rezoning Report for the construction of a 43-storey mixed-use development at 10 Dangar Street, Wickham (the site). The site is located within the Newcastle local government area (LGA) and occupies a prominent corner position immediately north of the Newcastle Interchange.

The project has been selected by the NSW Housing Delivery Authority (HDA) as a key development to help accelerate the delivery of well-located, diverse and affordable housing in New South Wales. Commencing in early 2025, the HDA plays a coordinating role across government agencies, focusing on unlocking complex sites through strategic planning, infrastructure coordination, and streamlined assessment pathways.

Following the Applicant's expression of interest (EOI 240837), the HDA considered and recommended to the Minister for Planning and Public Spaces (the Minister) that the project be declared SSD under Section 4.36(3) of the *Environmental Planning and Assessment Act 1979* (EP&A Act) on 23 June 2025. Following this recommendation, the development was declared by the Minister to be SSD pursuant to the *State Significant Development Declaration Order 2025 (No 10)*, Part 2, Section 1(a), dated 30 June 2025.

1.1 Purpose of this Report

The purpose of this report is to assess the impact of the development proposed under SSD-89869959 in accordance with the Flooding requirements set out in the SEARs issued by DPHI on 26 September 2025.

1.2 Relevant SEARs

This FIRA report addresses the following relevant Secretary's Environmental Assessment Requirements (SEARs), which were issued on 26 September 2025 in relation to the project, as set out in **Table 1**.

Table 1 Responses to SEARS Flooding Requirements

SEARS Request	Response / Location in Report
19. Flood Risk - Identify the flood planning area and level as set out in the relevant EPI and other supporting documents to determine; - The flood extent and velocity up to the Probable Maximum Flood and risk on-site having regard to adopted flood studies and, floodplain risk management studies and plans - The site access and egress routes - the potential effects of climate change,	The FPL is defined Council's Flood Certificate outlined in Section 2.2 and attached in Appendix D while the site is located in a Flood Planning Area subject to flood storage and flood fringe (see Appendix D). Flood risks are assessed in Section 3. Previous studies are detailed in Section 2.1 Emergency planning is detailed in Section 5. Flood risks in the vicinity of the subject property are assessed in Section 6.1. Climate change is included in Council's DFE and the resulting FPL.



SEARS Request	Response / Location in Report
- any relevant provisions of the <i>NSW Flood Risk Management Manual</i>, and any other relevant guidelines.	Guidelines are detailed in Section 2.2 .
• Where the development is occurring on flood prone land a flood impact and risk assessment (FIRA) must be prepared having regard to the <i>Flood Impact and Risk Assessment – Flood Risk Management Guide LU01</i>. When determining the scope and category of the FIRA the requirements outlined in the FIRA guide must be considered	This FIRA satisfies this requirement.
• Detail any flood risk management measures that are to be incorporated as part of the development having regard to relevant guidelines (including any design solutions, flood modification measures, property modification measures, operational procedures, or Flood Emergency Response Plan).	The proposed development which responds to flood risks on the site is detailed in Section 4.1. Flood emergency response is described in Section 6.

1.3 Background

The site was identified under the *Wickham Master Plan 2017* as a strategically significant location for increased development capacity, given its proximity to the Newcastle Interchange and its potential to support high-density, mixed-use development. The Master Plan proposed an uplift in planning controls, increasing the permissible building height from 45m to 60m, and the FSR from 5:1 to 6:1, subject to the delivery of public domain improvements, including a 3-metre southern setback adjacent to the transport interchange.

This strategic vision was subsequently reaffirmed in the *Wickham Master Plan 2021 Update* (PP-2021-1506) and further refined in the 2022 amendment, which supported additional incentive-based planning controls. The Community Infrastructure Incentives in Wickham Planning Proposal (PP-2022/1541), endorsed by Council in March 2022 (and subsequently approved 08 November 2022), proposed:

- An incentive FSR of 7:1 for Area E (the site),
- A maximum incentive building height of 60m, and
- Community infrastructure requirements.

In alignment with these strategies, the site has been subject to successive development consents as outlined in the Environmental Impact Statement (EIS) prepared by Beam Planning. These prior consents have been physically commenced through demolition and excavation works and establish the maximum envelope for basement structures. This SSDA will adopt and refine these commenced elements to expedite the assessment process, continue construction progress on the site, and ensure continuity with previously endorsed planning outcomes

1.4 The Proposal

1.4.1 Rezoning Proposal

To facilitate the proposed development described in Section 1.4.2, a concurrent Rezoning Proposal is sought to make the following amendments to the *Newcastle Local Environmental Plan 2012* (Newcastle LEP 2012) in relation to the site:



- Amend Clause 7.9 to permit a maximum building height of RL 152m on the site; and,
- Amend the Clause 7.9A to permit a maximum FSR of 14.4:1 on the site.

1.4.2 State Significant Development Application

The proposed amendments to the Newcastle LEP 2012, as outlined above, will facilitate the following development, proposed via a concurrent SSDA. Specifically, the proposed works sought under the SSDA include:

- Construction of a 43-storey (+ plant) mixed-use tower, comprising:
 - 245 residential apartments
 - 99 co-living units
 - Ground floor retail premises, to all three street frontages
 - A hotel component within the podium
 - Basement car parking
- Associated landscaping and public domain improvements, including the provision of a pedestrian through-site link that runs east/west adjacent to the Newcastle Interchange.

It is noted that the project will commit to providing 15% of the residential GFA as affordable housing for a minimum of 15 years, to be managed by a registered Community Housing Provider (CHP).

The proposed SSDA will seek consent for the use of basement structures and enabling works approved under DA2018/01197 (as modified).

For a detailed description of the proposed development, refer to the EIS prepared by Beam Planning, and the Architectural Drawings prepared by SJB Architecture.

1.5 The Site

The site is located at 10 Dangar Street, Wickham, within the Newcastle LGA. The site benefits from triple street frontages, with a primary street frontage of approximately 64m to Dangar Street, and secondary street frontages of approximately 61m to Hannell Street and 50m to Charles Street (see **Figure 1**).



Figure 1 Site Location (Source: Beam Planning, 2026)



The surrounding locality comprises a diverse mix of land uses including residential, commercial, and light industrial uses, reflecting the area's ongoing transition. The site's frontage to Hannell Street, a major arterial road, supports high levels of connectivity to the broader metropolitan area. The site is located immediately north of the Newcastle Interchange, providing bus, rail and light rail services. Strategically, the site sits at the intersection of the Newcastle West End, Wickham, and Honeysuckle precincts, positioning it to support the city's transition to a higher-density, mixed use metropolitan centre.

The site is currently vacant following demolition works approved under DA2018/01197 (as modified).

1.6 Terminology

The terminology adopted herein depends on the edition of Australian Rainfall and Runoff which provided the IFD data. In the case of assessments based on ARR1987 the ARI terminology was adopted for design floods. In the case of assessments based on ARR2019 the AEP terminology was adopted for design floods.



2 Available Information

The proposed development on 10 Dangar Street, Wickham is subject to mainstream and overland flow flooding. Previous studies of flooding of the Cottage Creek floodplain and of the site and guidelines include the following.

2.1 Previous Studies

2.1.1 2012 Newcastle City-wide Floodplain Risk Management Study and Plan

As summarised by BMT WBM, 2012¹:

This document is the complete Floodplain Risk Management Study and Plan for the Newcastle City-wide area. It is the culmination of many years of research and studies, including various Flood Studies for specific catchments, Floodplain Management Studies, and the previous Stage 1 Concept City-wide Flood Plan. The document provides a suite of actions, works and initiatives that when implemented will result in reductions to Risks to Life and Risks to Property across the City.

This City-wide Floodplain Management Plan excludes the Wallsend Commercial Centre, as this area already has an adopted Flood Plan (2009). Apart from updating the mapping of floodplain categories, this document does not supersede or negate the Wallsend Plan in any way. Implementation of both the City-wide Flood Plan and the Wallsend Flood Plan should occur concurrently.

2.1.2 2017 Williamstown Salt Ash Floodplain Risk Management Study & Plan

As summarised by BMT WBM, 2021²:

This report documents the Williamstown Salt Ash Floodplain Risk Management Study and Plan which investigates and presents a flood risk management strategy for the Williamstown / Salt Ash area. The study identifies the existing flooding characteristics and canvasses various measures to mitigate the effects of flooding. The end product is the Floodplain Risk Management Plan, which describes how flood liable lands within the Williamstown / Salt Ash area are to be managed in the future.

2.1.3 2024 Throsby, Styx & Cottage Creeks Flood Study

As summarised by Rhelm, 2024³:

The study area covers the catchments of Styx Creek, Throsby Creek, Cottage Creek and the Newcastle central business district (CBD) with a focus on understanding the flood behaviour and flood risk in these catchments

¹ BMT WBM (2012) "Newcastle City-wide Floodplain Risk Management Study and Plan", *Final Report*, Ver 3, prepared for Newcastle City Council, June, 219 pp + Apps

² BMT WBM (2017) "Williamstown Salt Ash Floodplain Risk Management Study & Plan", *Final Report*, Revision 4, prepared for Port Stephens Council, September, pp 123 + Apps

³ Rhelm (2024) "Throsby, Styx & Cottage Creek Flood Study", *Final Report*, Ver 4, prepared for Newcastle City Council, June, 70 pp + Apps



The flood model established as part of the Throsby, Cottage and CBD Flood Study (BMT WBM, 2008a) was provided by the City of Newcastle as a base for establishing an updated flood model.

This flood model was updated with the following key datasets:

- (i) Light Detection and Ranging (LiDAR) collected in 2014 and 2021. These data contain both ground elevations in the form of a digital elevation model (DEM) and point cloud data which categorises data based on ground cover (vegetation, roofs, paved surfaces, etc.).*
- (ii) Ground survey of Waterdragon Creek.*
- (iii) Updated intensity-frequency-duration (IFD) rainfall data and losses from the Australian Rainfall and Runoff (ARR) data hub (<http://data.arr-software.org/>).*
- (iv) Updated stormwater pit and pipe survey information collected in 2020.*
- (v) Revised oceanic boundary conditions for coincidence of ocean and catchment flooding based on guidance from the Department of Planning and Environment (DPE).*

The hydrologic model was established using the Watershed Bounded Network Model (WBNM) software package, while the two-dimensional (2D) hydraulic modelling package utilised was the TUFLOW software.

The hydrological and 2D hydraulic models were used to analyse a range of design events, including the Probable Maximum Flood (PMF), 1% annual exceedance probability (AEP), 2% AEP, 5% AEP and 10% AEP events. Storm durations were considered ranging from 10 minutes to 24 hours, using the 10 temporal pattern ensemble approach detailed in ARR2019.

Two climate change scenarios were also modelled considering future increases in rainfall intensity and sea level rise. The 1% AEP event in 2050 was estimated by modelling the 0.5% AEP event with a sea level rise of 0.4 m and the 1% AEP event in 2100 as estimated by modelling the 0.2% AEP event with a sea level rise of 0.9 m.

*.... The City of Newcastle has advised that **the Defined Flood Event (DFE) for this Flood Study should be selected as the 1% AEP in 2050** where development is subject to catchment flash flooding. Future flood planning levels will use this event as a basis plus an appropriate freeboard depth. Using this event as the DFE will make allowance for sea level rise and reduce risk for development planning horizons to 2050.*

In the vicinity of the subject property the following has been estimated by Rhelm, 2024:

- (i) The 1% AEP flood depths are plotted in **Figure 2**.*
- (ii) The 1% AEP flood depths in 2050 are plotted in **Figure 3**.*
- (iii) The 1% AEP flood hazards in 2050 are plotted in **Figure 4**.*
- (iv) The PMF hazards are plotted in **Figure 5**.*
- (v) The 1% AEP flood functions in 2050 are plotted in **Figure 6**.*
- (vi) The PMF flood functions are plotted in **Figure 7**.*



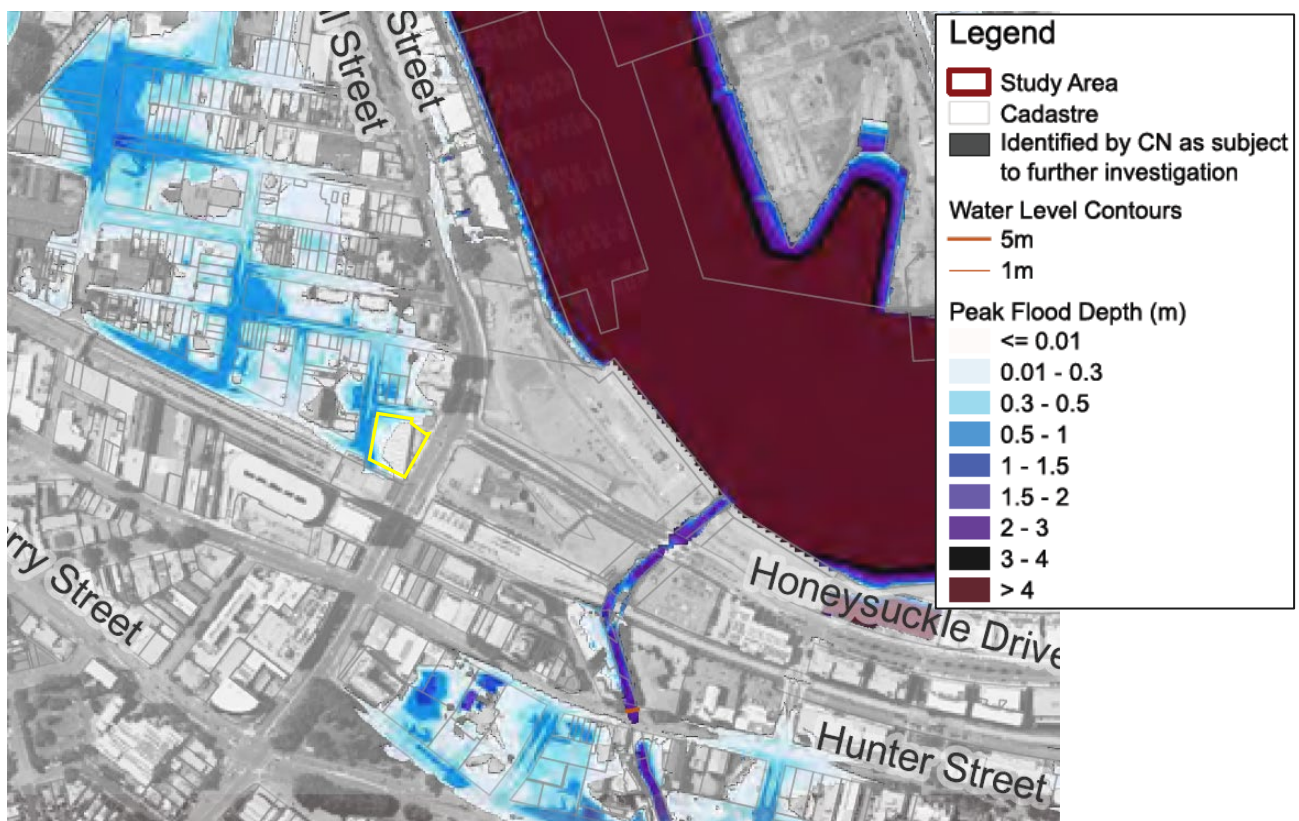


Figure 2 1% AEP Flood Depths (Source: Figure G306c, Rhelm, 2024)

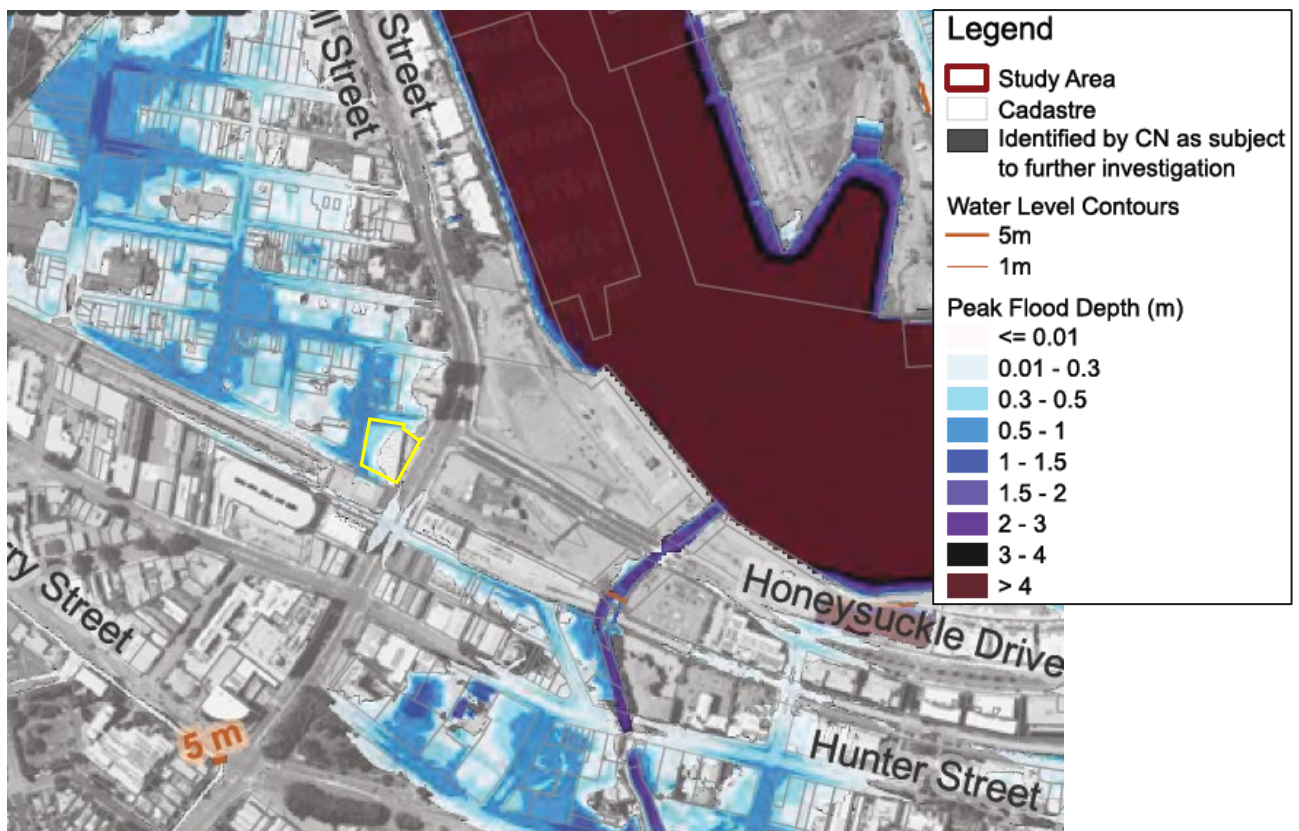


Figure 3 1% AEP in 2050 (Source: Figure G320c, Rhelm, 2024)

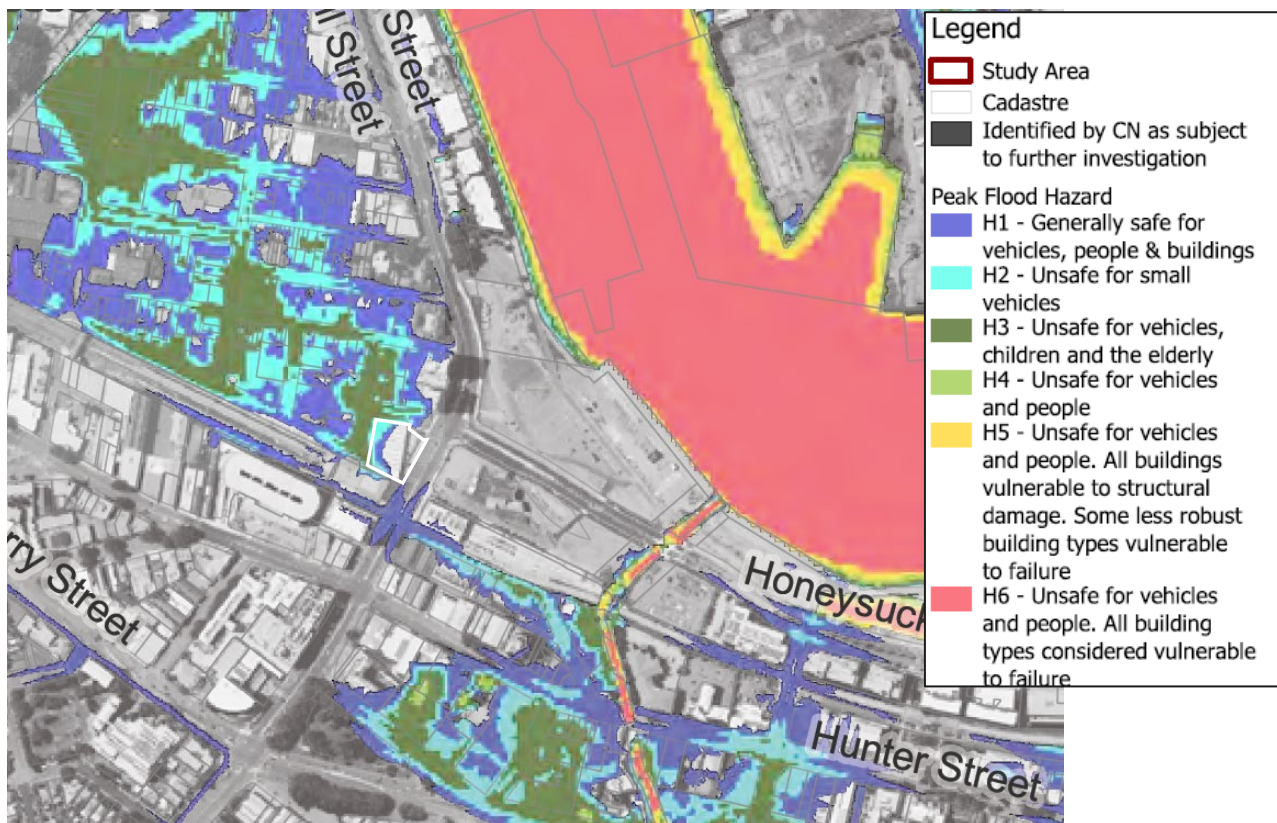


Figure 4 1% AEP Peak Flood Hazard in 2050 (Source: Figure G340c, Rhelm, 2024)

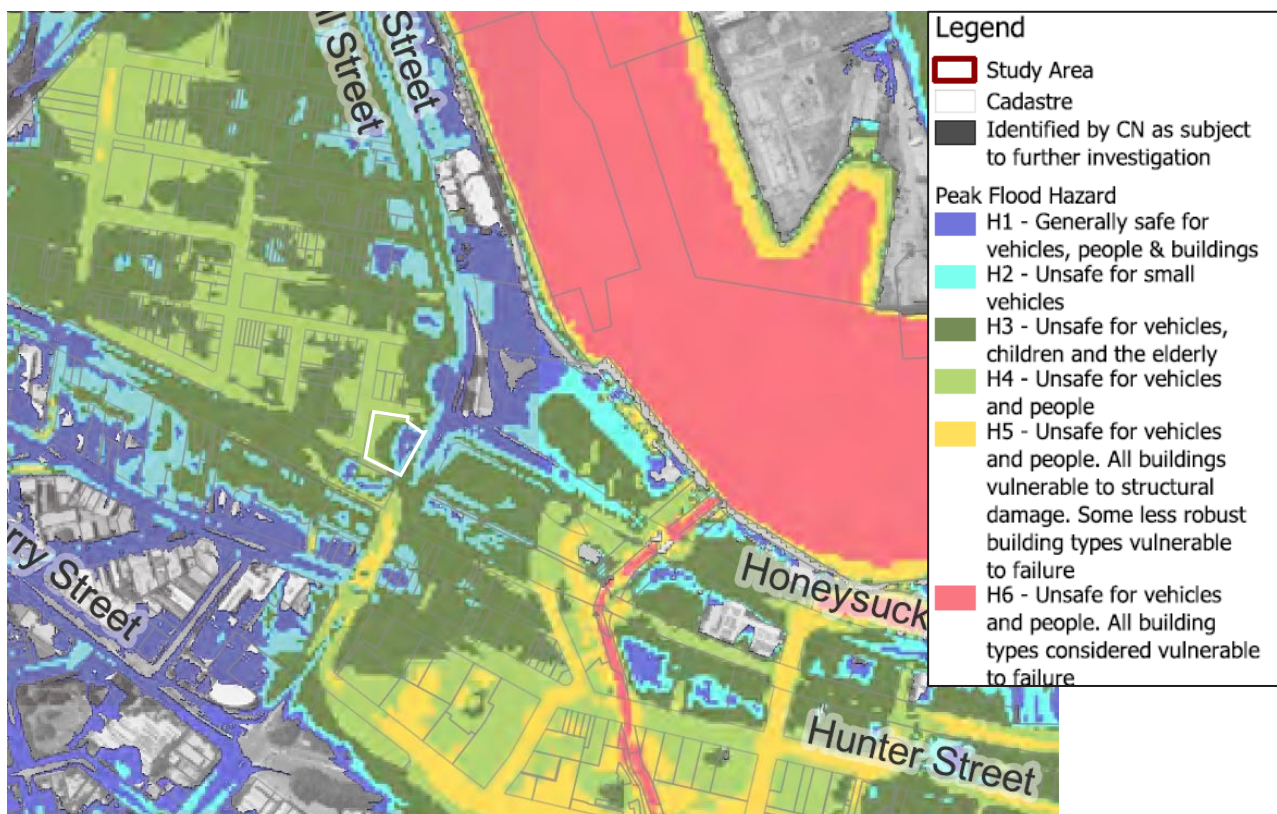


Figure 5 Peak PMF Hazard (Source: Figure G341c, Rhelm, 2024)

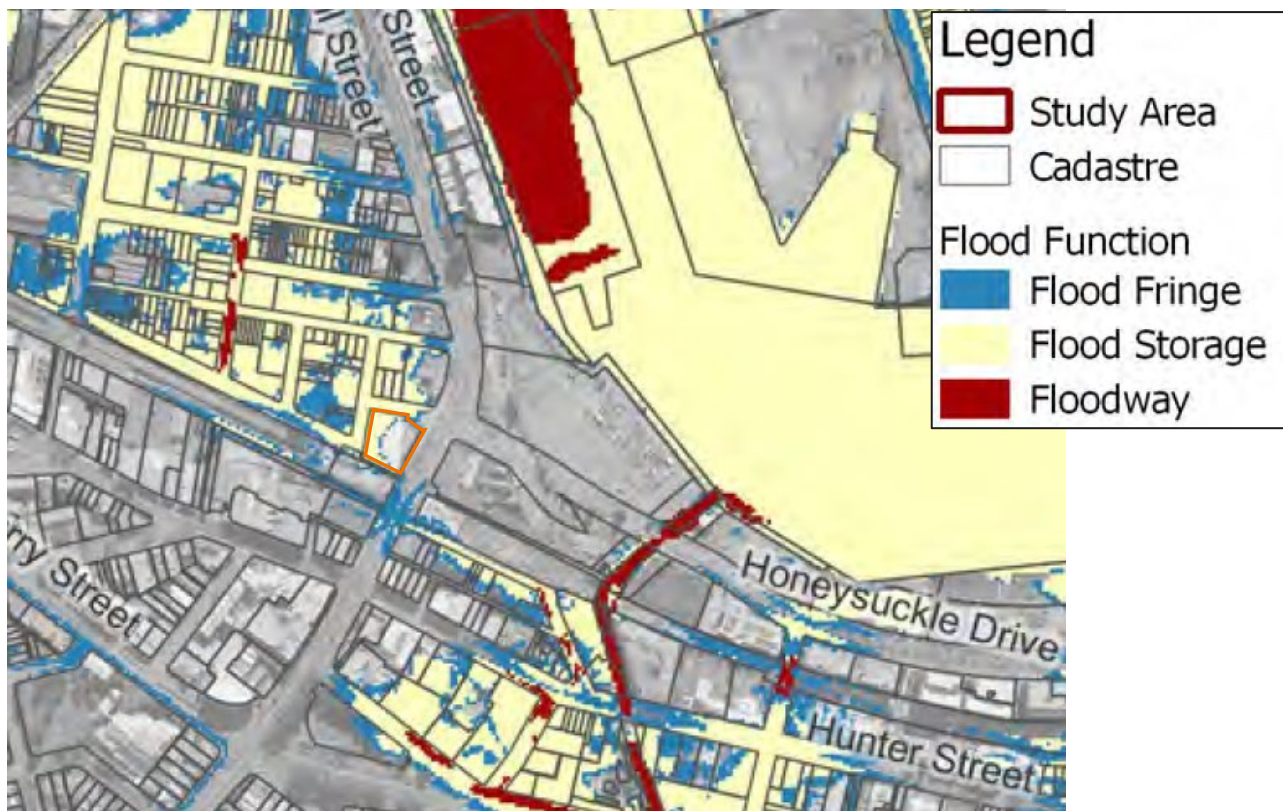


Figure 6 1% AEP Flood Function in 2050 (Preliminary) (Source: Figure G350c, Rhelm, 2024)

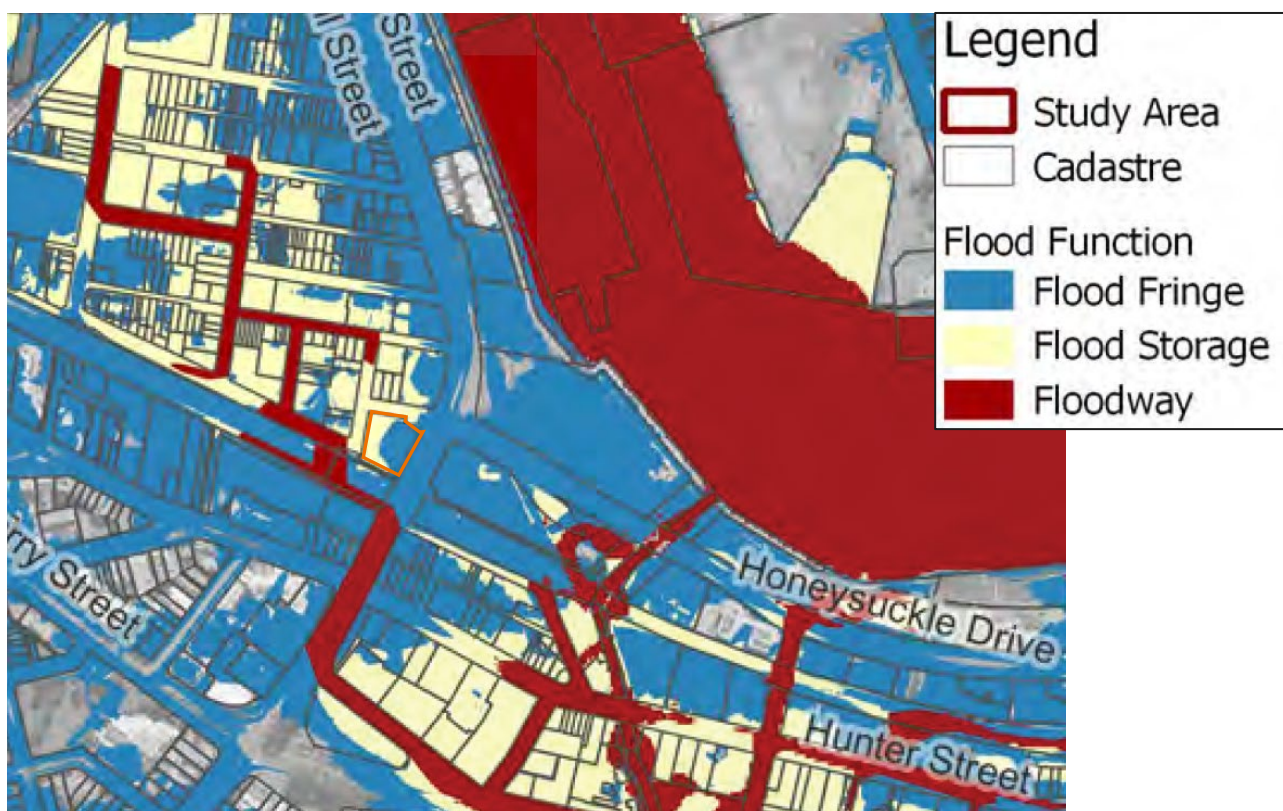


Figure 7 PMF Flood Function (Preliminary) (Source: Figure G351c, Rhelm, 2024)

2.1.4 2024 Lower Hunter Floodplain Cumulative Development Impact Study and Plan – Stage 2

As summarised, in part, by KBR, 2024⁴:

This report details Stage 2 of the three-stage Lower Hunter River Floodplain Cumulative Development Impact Study & Plan (herein referred to as the Study). Stage 1 was a scoping study and was completed in 2021 by Water Research Laboratory of the School of Civil and Environmental Engineering at UNSW Sydney. Stage 2 (this report) was prepared by KBR and utilised computer models to assess the sensitivity of the floodplain to filling associated with cumulative development. Stage 3 was prepared by GLN Planning on behalf of the study area Councils and provides recommendations for catchment-wide consistent strategies, policies and development controls to manage cumulative development in the Lower Hunter floodplain.

..... The flood modelling allowed for consideration as to what land uses were impacted and to what degree. A flood level increase of 100mm was adopted as the acceptable cumulative impact but generally flood level increases exceeding 50mm were avoided in urban residential areas which were considered to be relatively more sensitive to flood impacts than other areas. Changes in flood velocities were not significant when analysed on a cumulative impacts basis and other considerations outlined in the Manual were determined to likely be consequentially addressed if impacts on flood levels were managed

As described, in part, in Section 2.1 Hydraulic Models by KBR, 2024:

Hydraulic modelling completed as part of Stage 2 of the Study have been carried out using two TUFLOW models provided by the MCC and PSC respectively.

The MCC (Maitland City Council) model provided is the "downstream model" developed by WMA Water (circa 2009-2010) as part of the Hunter River Branxton to Green Rocks Flood Study completed in September 2010, which extends from upstream of Oakhampton to Green Rocks (referred to herein as the MCC model).

The PSC (Port Stephens Council) model provided was developed by BMT (circa 2016-2017) as part of the Williamtown - Salt Ash Floodplain Risk Management Study & Plan completed in September 2017, which extends from Osterley/Raymond Terrace to the outlet of Hunter River to the South Pacific Ocean near Stockton (referred to herein as the WTSA model).

Model Grid Resolution

The model grid resolution of the WTSA model was reduced from 20m to 10m at the request of the Council(s). This refinement was undertaken to ensure a consistent model grid resolution between the MCC and WTSA models (i.e. noting that the original model grid resolution of the MCC model was 10m).

⁴ KBR (2024) "Lower Hunter Floodplain Cumulative Development Impact Study and Plan – Stage 2", *Final Report*, prepared for GLN Planning, 3 September, 28 pp + Apps.



WTSA Downstream Model Boundary

Within the WTSA model, the provided model adopts a fixed downstream boundary level of 0 m AHD for all events. KBR revised the modelling to adopt a tidal boundary based on what was adopted within the original modelling for standard design events, this tidal boundary was maintained for all simulated events up to and including the PMF. The same model boundary level has been adopted at the two model outlets in the updated WTSA model (i.e. tidal boundary condition at the outlet of Hunter River applied to the outlet of Tilligerry Creek).

Adoption of TUFLOW HPC

The TUFLOW HPC solution scheme was adopted for the Study in place of the previously adopted TUFLOW Classic solution scheme for both the MCC and WTSA models. The adoption of the HPC solution scheme in the modelling has the advantage of significant reduction in simulation time while maintaining a reasonably similar overall result when compared to the Classic solution scheme. The adoption of the HPC solution scheme was discussed and agreed upon with the Councils at the onset of Stage 2 of the Study. Hydraulic modelling for this study was undertaken using the TUFLOW version 2020-10-AD-iSP.

2.2 Flood Information Certificate

Previously development proposals for the site have relied upon a flood Information Certificate (FL2018/00245) issued on 21 September 2018. The flood information contained in the 2018 certificate would be superseded by the 2024 Throsby, Styx & Cottage Creek Flood Study. Accordingly a new Flood Information Certificate was obtained from Newcastle City Council on 21 August 2025 (FL2025/00243). A copy of this certificate is appended as **Appendix D**.

A comparison of the 2018 and 2025 certificates is given in **Table 2**.

The 2025 certificate discloses, in part:

- The mainstream 1% AEP flood level is 2.20 m AHD with a velocity of up to 0.15 m/s
- The mainstream PMF level is 3.4 m AHD with a low velocity of 0.15 m/s
- The overland flow 1% AEP flood level in 2050 is 2.3 m AHD with a velocity up to 0.05 m/s
- The overland flow PMF level is 3.3 m AHD with a velocity of up to 1.2 m/s
- The minimum habitable floor level is 2.8 m AHD
- No part of the site is mapped as Floodway
- Part of the site is mapped as Flood Storage
- On-site Flood Refuge is required
- Clause 5.21 and 5.22 of the Newcastle LEP 2012 must be addressed.



Table 2 Comparison of 2018 and 2025 Flood Certificates

Flood Information Certificate	21-Aug-25 (FL2025/00243)	21-Sep-18 (FL2018/00245)
Ocean Flooding		
Is any part of the site affected by a floodway?	No	No
Is any part of the site affected by a flood storage area?	No	No
Estimated 1% Annual Exceedance Probability event level: (equivalent to the "Defined Flood Level" in the Building Code of Australia)	2.20m AHD	2.20m AHD
Estimated Maximum Flow Velocity of floodwaters (in the "Defined Flood Event" as per the Building Code of Australia)	0.15m/s	-
Highest Property Risk Category*	P3	P3
Estimated Probable Maximum Flood Level	3.40m AHD (0.15m/s)	3.40m AHD
Highest Life Risk Category*	L1 (H4)	L1
Local Catchment Flooding		
Is any part of the site affected by a floodway?	No	No
Is any part of the site affected by a flood storage area?	Yes	Yes
Estimated 1% Annual Exceedance Probability event level: (equivalent to the "Defined Flood Level" in the Building Code of Australia)	2.30m AHD	2.18m AHD
Estimated Maximum Flow Velocity of floodwaters (in the "Defined Flood Event" as per the Building Code of Australia)	0.05m/s	0.3m/s
Highest Property Risk Category**	P3	P2
Estimated Probable Maximum Flood Level	3.30m AHD (maximum flow velocity of 1.20m/s)	3.01m AHD (maximum velocity of 0.76m/s)
Highest Life Risk Category**	L4 (H4)	L4
The Newcastle Development Control Plan 2023 addresses the issues of flood management for new development.		
Development in a floodway is not generally allowable due to likely redistribution of flood water.	Not Applicable	Not Applicable
Filling of a flood storage area by more than 20% is not generally allowable due to redistribution of flood water.	Applicable (Part site - see figure below)	Applicable
Minimum floor level for occupiable rooms in a new development on this site is: (equivalent to the "Flood Hazard Level" in the Building Code of Australia)	2.80m AHD	2.68m AHD
Is onsite flood refuge required?	Yes	Yes
The Newcastle Local Environmental Plan 2012 includes provisions that apply to development within flood prone areas		
Is clause 5.21 Flood Planning applicable to a development on this site?	Applicable	
Is clause 5.22(2)(a) Special Flood Considerations applicable to a development on this site?	Applicable	
Is clause 5.22(2)(b) Special Flood Considerations applicable to a development on this site?	Applicable	



2.3 Guidelines

2.3.1 2021 Evacuation Management Guideline

The Evacuation Management Guidelines published by NSW Resilience in 2021, in part, states:

The 2021 NSW State Flood Plan sets the Government's agenda for change in New South Wales. Of note, Goal 28 is to ensure NSW is ready to deal with major emergencies and natural disasters.

This guideline is prepared under the auspices of the EMPLAN, to compliment relevant sub and supporting plans.

It takes an all-hazards approach and outlines the key requirements and principles, authorities, responsibilities and mechanisms for the conduct of evacuations where formal emergency management arrangements are required.

The aim of this guideline is to inform and enhance existing emergency management arrangements for evacuations during actual and/or forecast emergencies. This guideline does not replace evacuation arrangements for specific hazards (eg. floods, bush fires) which are contained within individual Sub Plans and agency specific policies.

This guideline is intended to have a general, cross sector and all hazards' applications.

Combat Agencies and Functional Agencies can choose to employ or enhance its provisions within their respective internal policies.

2.3.2 2023 Flood Risk Management Guideline FB03

The Flood Risk Management Guideline FB03 Flood Hazard released in June 2023 states, in part:

*This guideline builds on the advice provided in the **Flood risk management manual: the policy and manual for the management of flood liable land** (the manual; DPE 2023). It supports councils in their role in delivery of the NSW Flood prone land policy (the policy) through the flood risk management process outlined in the manual.*

*This guideline refers to the manual, policy and other flood risk management (FRM) tools and guidelines, relevant state agencies and legislation. Details on these are provided in the current version of **Administration arrangements: flood risk management guideline AG01** (FRM guideline AG01).*

Hazardous flood conditions can exist without a flood risk. If floodplains were unoccupied and unused, flooding would still be hazardous but would not create a risk to the community. It is the human interaction with flooding that creates risk. Exposure can lead to the potential loss of life, injury, failure of buildings and infrastructure, and economic loss in future floods.

The degree of hazard varies with the severity of flooding and with flood extent, time and location. Understanding this is important to understanding and managing flood risk.

This guideline provides:

- *advice on uses of flood hazard information (Section 2)*
- *advice on flood hazard thresholds (Section 3)*
- *information on flood hazard categorisation based on the combination of flood velocity and depth (Section 4).*



2.3.3 2023 Flood Risk Management Guideline EM01

The Flood Risk Management Guideline EM01 Support for Emergency Management Planning released in June 2023 states, in part:

*This guideline provides advice on how the flood risk management (FRM) framework and process described in the **Flood risk management manual: the policy and manual for the management of flood liable land** (the manual; DPE 2023) can consider and support flood emergency management (EM). It outlines how the NSW State Emergency Service (NSW SES) as the combat agency for flood, storm and tsunami, plans for flooding, as well as the key EM principles and strategies it uses when undertaking EM planning for the community.*

The guideline also provides an understanding of:

- *how information from the FRM process is used to support flood EM planning;*
- *key EM constraints and how these may impact FRM for communities;*
- *the limitations of flood emergency response strategies and how these can inform decision-making.*

FRM involves partnerships between government agencies, local councils and communities. This provides for more effective and coordinated FRM to the community through the FRM framework and process, which are supported by the Floodplain Management Program.

The NSW SES is a key stakeholder in this partnership and in local council FRM committees (and technical working groups) that support the development of FRM plans through the FRM process. These plans provide the basis for strategic understanding, and effective consideration and management of EM and public safety risks to the community.

Through the FRM process the NSW SES can provide councils with:

- *valuable knowledge of historical flooding and its impacts on the community that can assist councils during the FRM process*
- *advice on known EM constraints, response strategies or key limitations to effective emergency response by the community where flood plans are in place*
- *options that may improve the effectiveness of the emergency response, for example, this could include improvements to, or provision of, a total warning system for flood (TWSF) service to facilitate more effective warning and support community action.*

Councils in turn can provide flood information developed through the FRM process to the NSW SES. This can inform the development and update of flood intelligence and local flood plans.



2.3.4 2025 Shelter in Place Guideline

As described on the NSW Planning Portal ([Shelter-in-Place Guideline for flash flooding | Planning Portal - Department of Planning and Environment](#)):

In January 2023, the Department exhibited a draft Shelter-in-Place Guideline to provide clear and consistent guidance for the about when shelter in place can be used.

The draft guideline was on exhibition for public comment from 17 January until 28 February 2023.

The guideline was amended to reflect feedback received during the exhibition, make the guideline criteria clearer, and clarify that shelter-in-place is for flash flooding only

On 7 January 2025, DPHI released the 2025 Shelter-in-Place (SIP) Guideline.

The intent of the Guideline is to:

- *guide proponents on where shelter-in-place may be considered in land use planning*
- *provide consent authorities guidance on matters that may be considered in assessing planning proposals and development applications where shelter-in- place is proposed*
- *assist councils when considering the role of shelter-in-place within their own local guidelines, policies, and development control plans.*

As described, in part, by DPHI, 2025:

When considering shelter-in-place, consent authorities should take a risk-based approach that is informed by the proposal's scale and establishes controls and mitigation measures that reflect the duration and depth of modelled flooding up to the PMF. The Support for Emergency Management Guideline (EM01) (table 12) provides advice on the application of emergency management considerations to minimise residual risks to occupants. In addition to this, the following will help guide consent authority when initially assessing if shelter-in-place is an appropriate emergency management strategy for the site:

1. *does shelter-in-place align with existing emergency management strategies for the area, as determined through the flood risk management process and by the NSW SES*
2. *has evacuation off-site (the primary emergency management strategy) been investigated and determined to be unachievable*
3. *does the development include medical centres, emergency service and community facilities, and sensitive and hazardous land uses, some of which may not be suitable for shelter-in-place*
4. *shelter-in-place for greenfield development is not supported*
5. *whether there is existing government developed flood warning systems that give advanced detailed forecasts of flash flooding to allow sufficient time to evacuate to the proposed refuge locations⁵*

⁵ Flash flood warning systems are not failsafe and should not be the only mechanism to get people to shelter-in-place



6. *can the community effectively be informed of the risks associated with the emergency management strategy*

Following satisfactory consideration of the above issues, the Flood Impact and Risk Assessment (FIRA) being undertaken for the site must provide advice for the consent authority to consider the suitability of the site for shelter-in-place. The FIRA should include:

7. *detailed assessment of evacuation off-site (the primary emergency management strategy) to determine that evacuation off-site is not achievable.*
8. *the flood behaviour at the site, with consideration of climate change and assessment of the potential maximum duration of isolation up to and including the PMF to identify that:*
 - a. *flash flooding is the only flood risk present at the site, whether it be from overland flooding, local creek or riverine flooding, and*
 - b. *the flooding occurs within less than 6 hours from the commencement of causative rain and the duration of shelter-in-place due to isolation by floodwaters is less than 12 hours from the commencement of rainfall, and*
 - c. *the development is not subject to high hazard flooding (e.g. floodways, high hazard H5 or H6 areas) or surrounding roadways are not subject to high hazard flooding.⁶*

Following consideration of items 1 to 7, and if items 8a,b and c are met, and the consent authority considers shelter-in-place is an appropriate emergency response strategy the following items must also be considered through a FIRA:

9. *how shelter-in-place will be:*
 - a. *used as part of the site's emergency management response, including actions before, during and after sheltering-in-place, and*
 - b. *communicated to occupants and visitors of the building and how this communication will be maintained for the life of the development.*
10. *an understanding of the secondary risks and how the proponent proposes they will be managed is outlined in the FIRA. Secondary risks include medical emergencies, building fire, health and wellbeing.*
 - a. *Table 12 of EM01 should be used to consider whether the risks could be effectively managed.*

⁶ Flood Risk Management Guideline FB03 Flood Hazard, DCCEE, 2023



3 Flood Risk Assessment

As outlined in Section 2.2, a new Flood Information Certificate was obtained from Newcastle City Council on 21 August 2025 (FL2025/00243). A copy of this certificate is appended as **Appendix D**.

The 2025 certificate describes both “Ocean Flooding” and “Local Catchment Flooding”.

Ocean Flooding flood levels, velocities and flood hazard and risk categories are reported to be based on the 2012 Newcastle City-wide Floodplain Risk Management Study (BMT WBM, 2012).

In order to assess the impacts of proposed development under ocean flooding conditions a request was submitted to Newcastle City Council to be provided copies of the 2012 model and results files. On 20 November 2025 Newcastle City Council advised that it was “*unable to provide the 2012 City Wide FRMS&P model and data files*”. Consequently an assessment of the impact of the proposed development under Council’s adopted ocean flooding conditions was unable to be undertaken.

Local catchment flood levels, velocities and flood hazard and risk categories are reported to be based on the 2024 Throsby, Styx and Cottage Creek Flood Study

In order to assess the impacts of proposed development under local catchment flooding conditions a request was also submitted to Newcastle City Council and copies of the 2024 model and results files were provided. Consequently an assessment of the impact of the proposed development under Council’s adopted local catchment flooding conditions has been undertaken.

3.1 Floodplain Model

The floodplain model assembled for the 2024 Throsby, Styx and Cottage Creek Flood Study was adopted for the assessment of Benchmark Conditions.

3.2 Benchmark Conditions

The Benchmark Conditions are mapped as follows:

3.2.1 5% AEP Flood

Flood Levels, Depths and Velocities

The estimated 5% AEP flood extents and levels, flood depths, flood velocities under Benchmark Conditions are plotted respectively in **Figures E1, E2 and E3** in **Appendix A**.

Flood Hazards

2023 FB03 Flood Hazards

The 2023 Flood Risk Management Guideline FB03 released on 30 June 2023 by NSW DPE includes a plot of flood hazard vulnerability curves based on six hazard categories H1 – H6 (see **Figure 8**).



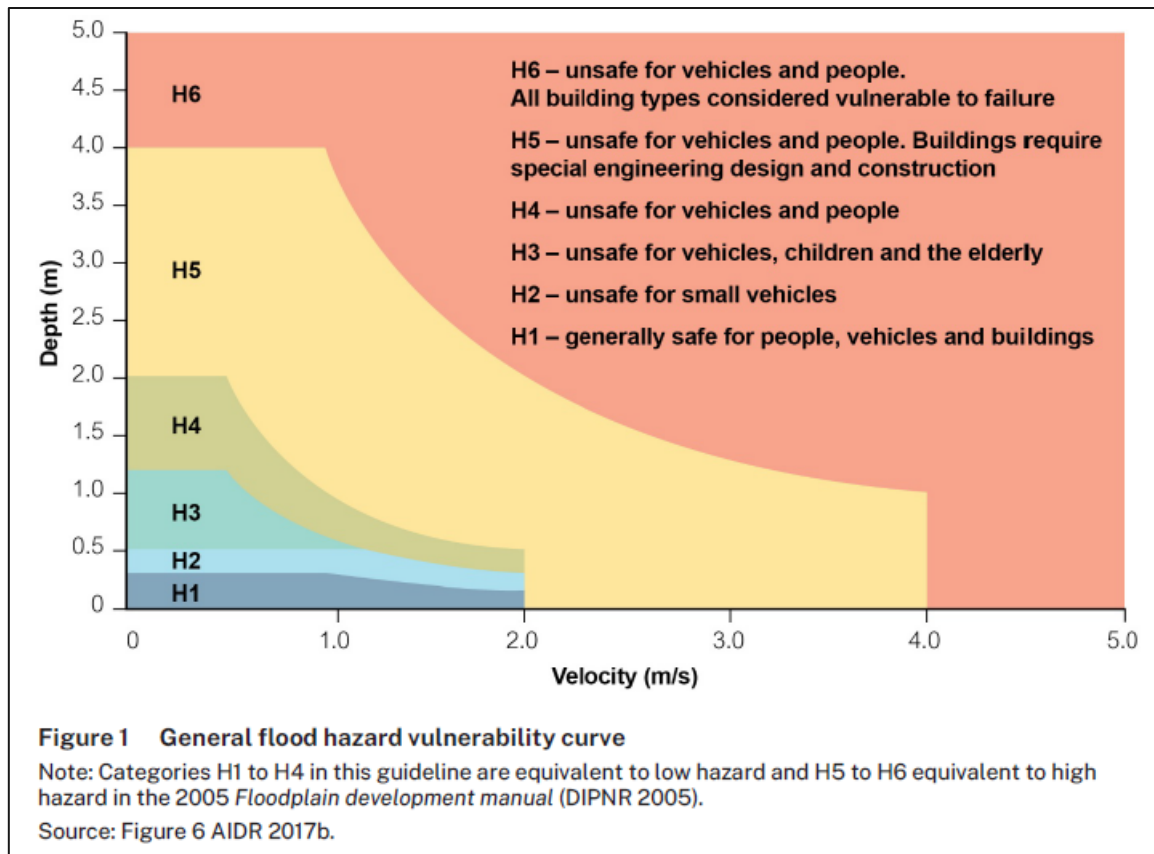


Figure 8 Flood Hazard Categories (Source: 2023 FRM Guideline FB03)

The flood hazard categories in a 5% AEP flood are plotted in **Figure E4** in **Appendix A**.

3.2.2 1% AEP Flood

Flood Levels, Depths and Velocities

The estimated 1% AEP flood extents and levels, flood depths, flood velocities under Benchmark Conditions are plotted respectively in **Figures E5, E6** and **E7** in **Appendix A**.

Flood Hazards

The flood hazard categories in a 1% AEP flood are plotted in **Figure E8** in **Appendix A**.

3.2.3 1% AEP in 2050 (DFE)

Flood Levels, Depths and Velocities

The estimated 1% AEP in 2050 flood extents and levels, flood depths, flood velocities under Benchmark Conditions are plotted respectively in **Figures E9, E10** and **E11** in **Appendix A**.

Flood Hazards

The flood hazard categories in the 1% AEP in 2050 flood are plotted in **Figure E12** in **Appendix A**.

3.2.4 1% AEP in 2100

Flood Levels, Depths and Velocities

The estimated 1% AEP in 2100 flood extents and levels, flood depths, flood velocities under Benchmark Conditions are plotted respectively in **Figures E13, E14 and E15** in **Appendix A**.

Flood Hazards

The flood hazard categories in the 1% AEP in 2100 flood are plotted in **Figure E16** in **Appendix A**.

3.2.4 PMF

Flood Levels, Depths and Velocities

The estimated PMF extents and levels, flood depths, flood velocities under Benchmark Conditions are plotted respectively in **Figures E17, E18 and E19** in **Appendix A**.

Flood Hazards

The flood hazard categories in the PMF are plotted in **Figure E20** in **Appendix A**.



4 Flood Impact Assessment

The assessment of flooding under the proposed development was undertaken by modifying the floodplain model of Benchmark Conditions to represent the proposed development as follows.

4.1 Future Conditions

The proposed layout development is described in the selected Architectural Drawings attached in **Appendix E**.

The configuration of the ground floor (Level 00) is detailed in **Figure 9**.

The proposed development includes:

- Representing the ground floor levels and adjusting ground levels external to the building as outlined in Figure 9;
- Adopting a surface roughness for the loading dock based on a paved roughness, a building roughness for all remaining ground floor areas and a roughness for external landscaping based largely on paving;

Based on the previous approved development which did not include provision for flood storage within the building footprint, the proposed development does not include any provision for flood storage.

Based on the events assessed under Benchmark Conditions, flooding under Future Conditions is mapped as follows:

4.1.1 5% AEP Flood

Flood Levels, Depths and Velocities

The estimated 5% AEP flood extents and levels, flood depths, flood velocities under Future Conditions are plotted respectively in **Figures F1, F2 and F3** in **Appendix B**.

Flood Hazards

The flood hazard categories in a 5% AEP flood are plotted in **Figure F4** in **Appendix B**.

4.1.2 1% AEP Flood

Flood Levels, Depths and Velocities

The estimated 1% AEP flood extents and levels, flood depths, flood velocities under Future Conditions are plotted respectively in **Figures F5, F6 and F7** in **Appendix B**.

Flood Hazards

The flood hazard categories in a 1% AEP flood are plotted in **Figure F8** in **Appendix B**.



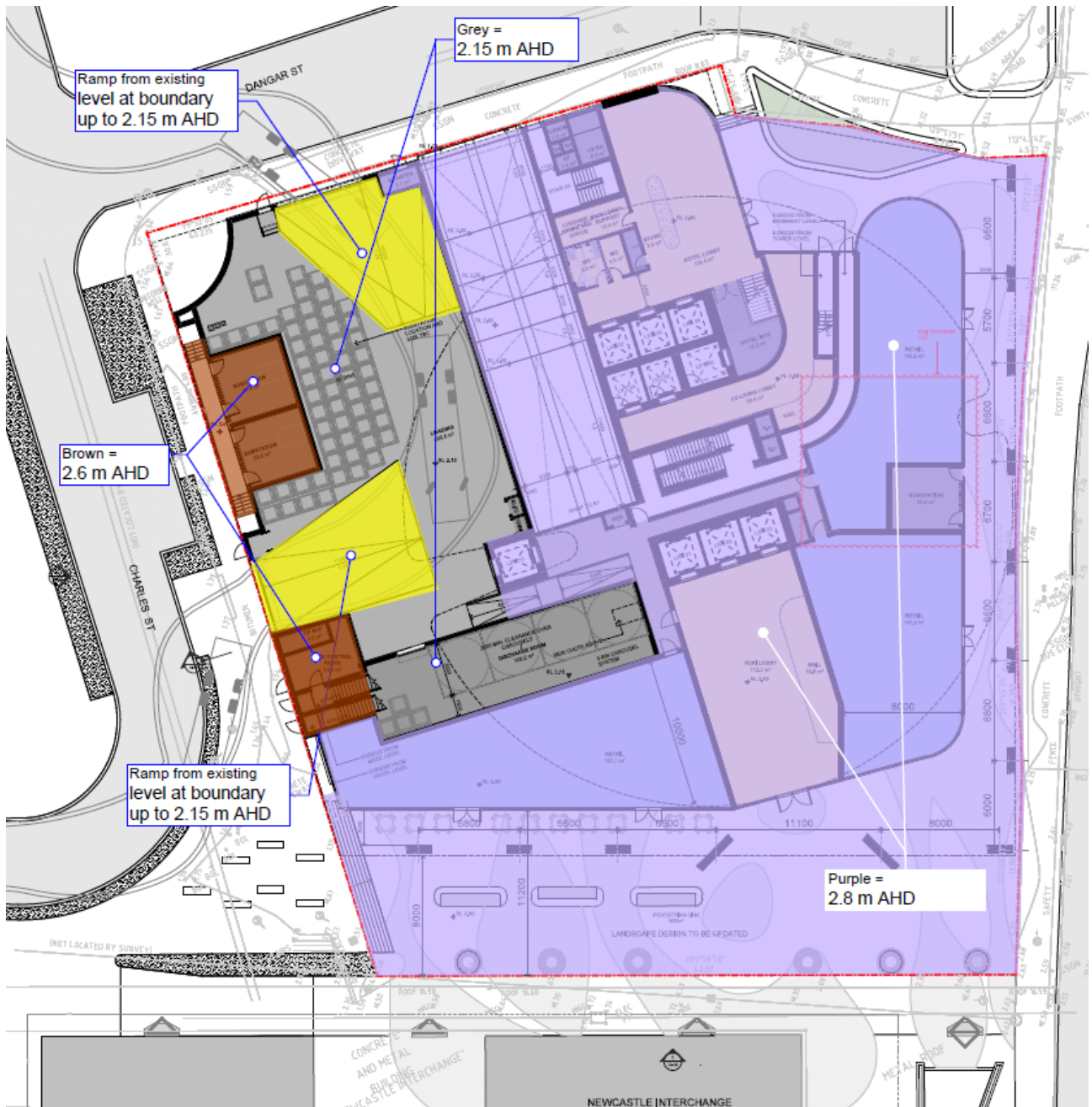


Figure 9 Model representation of Ground Floor Levels

4.1.3 1% AEP in 2050 (DFE)

Flood Levels, Depths and Velocities

The estimated 1% AEP in 2050 flood extents and levels, flood depths, flood velocities under Future Conditions are plotted respectively in **Figures F9, F10 and F11** in **Appendix B**.

Flood Hazards

The flood hazard categories in the 1% AEP in 2050 flood are plotted in **Figure F12** in **Appendix B**.

4.1.4 1% AEP in 2100

Flood Levels, Depths and Velocities

The estimated 1% AEP in 2100 flood extents and levels, flood depths, flood velocities under Future Conditions are plotted respectively in **Figures F13, F14 and F15** in **Appendix B**.

Flood Hazards

The flood hazard categories in the 1% AEP in 2100 flood are plotted in **Figure F16** in **Appendix B**.

4.1.4 PMF

Flood Levels, Depths and Velocities

The estimated PMF extents and levels, flood depths, flood velocities under Future Conditions are plotted respectively in **Figures F13, F14 and F15** in **Appendix B**.

Flood Hazards

The flood hazard categories in the PMF are plotted in **Figure F16** in **Appendix B**.

4.2 Flood Impact Assessment

4.2.1 Flood Level Impacts

The estimated impacts of the proposed development on the 5% AEP, 1% AEP, 1% AEP in 2050, 1% AEP in 2100 flood levels and the PMF levels (in comparison to Benchmark Conditions) are plotted respectively in **Figures I1, I4, I7, I10 and I13** in **Appendix C**.

It is concluded that:

- In the 5% AEP, 1% AEP, 1% AEP in 2050, 1% AEP in 2100 the flood level impacts are negligible;
- In the PMF there is a small area on the southern boundary where the PMF level increases by around 0.05 m;
- Overall the proposed development has a negligible adverse impact on flood levels.

4.2.2 Flood Velocity Impacts

The estimated impacts of the proposed development on the 5% AEP, 1% AEP, 1% AEP in 2050, 1% AEP in 2100 flood velocities and the PMF velocities (in comparison to Benchmark Conditions) are plotted respectively in **Figures I2, I5, I8, I11 and I14** in **Appendix C**.

It is concluded that:

- In the 5% AEP, 1% AEP, 1% AEP in 2050, 1% AEP in 2100 there are some scattered small impacts on flood velocities which are considered to have a negligible impact;
- In the PMF there is a small area south of the southwest corner of the subject property where the PMF velocities increases but remain below 1.5 m/s and therefore are not a scour concern;
- Overall the proposed development has a negligible adverse impact on flood velocities.



4.2.3 Flood Hazard Impacts

The estimated impacts of the proposed development on the 5% AEP, 1% AEP, 1% AEP in 2050, 1% AEP in 2100 flood hazards and the PMF hazards (in comparison to flood hazards under Benchmark Conditions) are plotted respectively in **Figures I3, I6, I9, I12 and I125** in **Appendix C**.

It is concluded that:

- In the 5% AEP, 1% AEP, 1% AEP in 2050, 1% AEP in 2100 there are some scattered small changes in the flood hazard which are considered to have a negligible impact;
- In the PMF there is scattered impacts on flood hazard where the local extent of a flood hazard category has changed by one grid cell which does not significantly change the hazards experience on the floodplain in the vicinity of the subject property;
- Overall the proposed development has a negligible adverse impact on flood hazards.

4.2.4 Flood Storage

The estimated flood storage under pre-development (Benchmark) Conditions in the 1% AEP flood in 2050 is mapped in **Figure 10**. The estimated flood storage under Benchmark Conditions in the 1% AEP in 2050 flood is 571 m³.

Based on the previous approved development which did not include provision for flood storage within the building footprint, the impacts on flooding including flood levels, velocities, hazards and storage of the proposed development without any flood storage (except for inundation of the loading dock area which provides around 80 m³ in the % AEP in 2050 flood) are described in Section 4.2.1, 4.2.2 and 4.2.3. It was concluded that the proposed development without any flood storage except for the loading dock has a negligible adverse impact on flood levels, velocities and hazards.

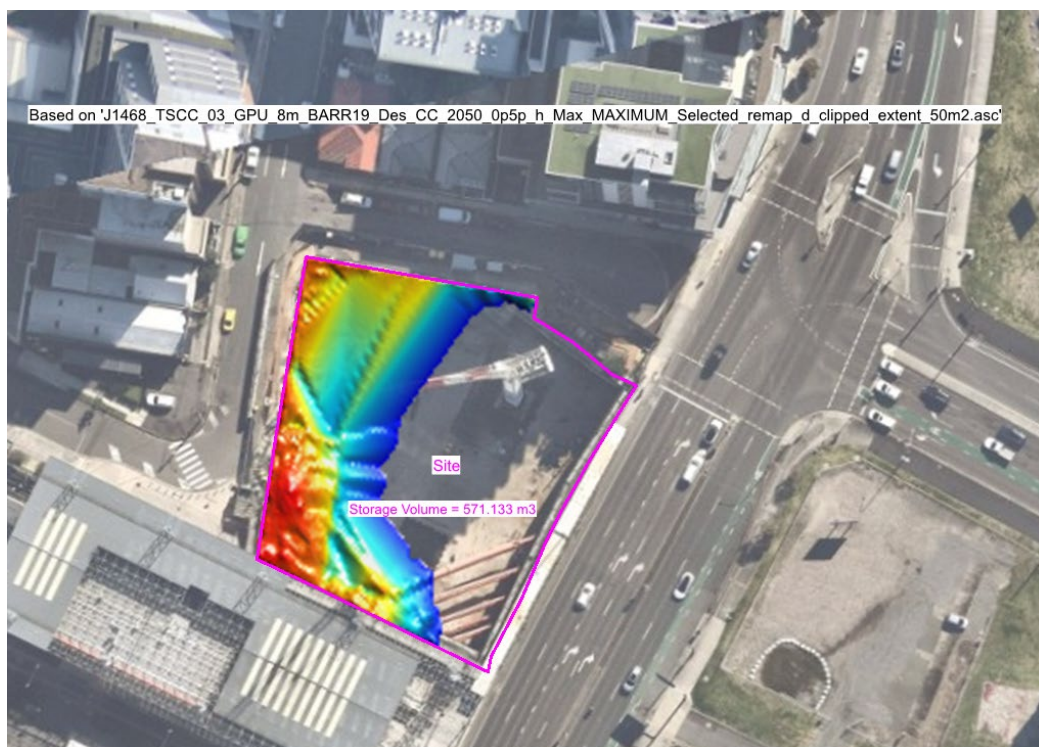
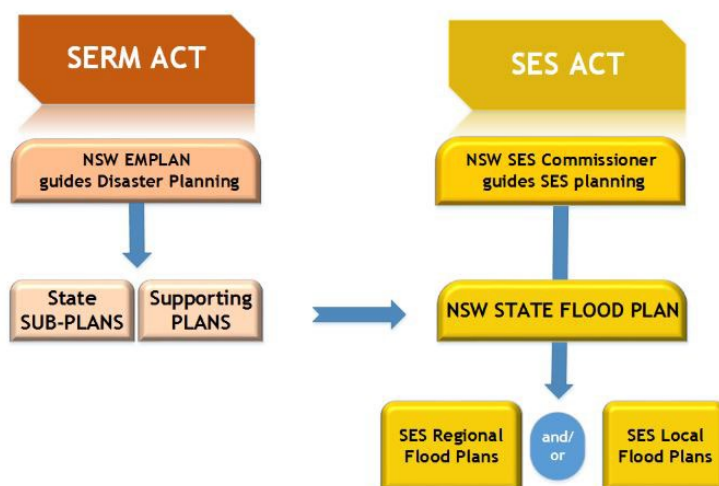


Figure 10 Flood Storage in the 1% AEP flood in 2050 under Benchmark Conditions

5 Emergency Planning

The hierarchy of plans which guide the planning for floods in NSW is as follows:

NSW Hierarchy of Plans - Floods



5.1 2023 New South Wales State Emergency Management Plan

The NSW State Emergency Management Plan (EMPLAN) is overviewed as follows:

5.1.1 Aim

- 113 *The State Emergency Management Plan (EMPLAN) describes NSW's approach to emergency management, governance and coordination arrangements, and roles and responsibilities of agencies. The plan is supported by hazard-specific sub plans and functional area supporting plans.*
- 114 *Although primarily for agencies with roles and responsibilities in emergency management, the EMPLAN is a useful reference for other entities, groups and people who are interacting with emergency management*

5.1.2 Objectives

- 115 *Consistent with the State Emergency and Rescue Management Act 1989 (SERM Act), the objectives of the EMPLAN are to: provide clarity as to command and control, roles and coordination of functions in emergency management across all levels*
- a) *emphasise risk management across the full spectrum of prevention, preparation, response and recovery*
 - b) *emphasise community engagement in the development and exercise of plans as well as in their operational employment*
 - c) *ensure that the capability and resourcing requirements of these responsibilities are understood*

- d) *promote the continuous improvement of emergency management policy and practice at a state level, including by considering reviews and inquiries into emergency operations, exercises and training evaluations*

The Plan promotes a comprehensive approach based on:



Prevention: *includes identifying hazards, assessing threats to life and property, and taking measures to reduce potential loss to life or property.*



Preparation: *includes arrangements or plans to deal with an emergency or the effects of an emergency. This includes enhancing the capacity of agencies and communities to cope with the consequences of emergencies.*



Response: *includes the process of combating an emergency and of providing immediate relief for persons affected by an emergency. This ensures the immediate consequences of emergencies to communities are minimised.*



Recovery: *includes the process of returning an affected community to its proper level of functioning after an emergency. This may involve measures that support individuals and communities affected by emergencies in the reconstruction of physical infrastructure and restoration of physical, social, environmental and economic wellbeing.*

Download from: [State Emergency Management Plan \(EMPLAN\) | NSW Government](#)

5.2 2024 NSW State Flood Plan

The NSW State Flood Plan is a sub plan of the State Emergency Management Plan (EMPLAN) (NSW Government, 2017). It has been written and issued under the authority of the *State Emergency and Rescue Management Act 1989* (NSW) ('SERM Act'), the SES Act and the EMPLAN.

The purpose of this NSW Flood Emergency Sub Plan (NSW State Flood Plan) is to set out the state level multi-agency arrangements for the emergency management of flooding in NSW, including Lord Howe Island.

Download from: [NSW State Flood Plan](#)

As described by the Plan, in part:

This plan describes the state-level emergency management arrangements for prevention, preparation, response (including immediate relief) and transition to recovery of flood emergencies affecting NSW communities.

In this plan a 'flood' is defined as a relatively high-water level which overtops the natural or artificial banks in any part of a stream, river, estuary, lake, or dam, and/or local overland flooding associated with drainage before entering a watercourse and/or inundation resulting from super-elevated sea levels and/or waves (including tsunamis) overtopping coastline defences. Any vehicle or pedestrian access way is deemed to be an artificial bank for the purpose of this plan and subordinate plans.

Flash flooding, can occur in a short duration (within 6 hours) after rain, causing overland flood and rapid stream rises.



This plan recognises that agencies have responsibilities during emergencies allocated under the EMPLAN or other sub or supporting plans to the EMPLAN. This plan does not repeat those responsibilities or roles but does refer to them.

This plan includes:

- *The potential risks and consequences of the emergency to the social, built, economic, natural and cultural environments.*
- *The policy and programs in place to mitigate these risks before, during and after an emergency.*
- *The arrangements for control and coordination led by the NSW SES Commissioner for managing a flood impact.*
- *An outline of the approach as determined by the NSW SES Commissioner in managing a flood impact and the agencies responsible for managing specific strategies.*
- *The multi-agency management arrangements and integrated strategies at the state, regional and local levels (include national-level arrangements where these exist).*
- *Links to sources of information where the reader can obtain further detail.*

This plan reflects current legislation, the arrangements in the EMPLAN, the strategic direction for emergency management in NSW and accepted state practice for emergency management. The EMPLAN arrangements have not been repeated unless necessary to ensure context and readability. Any variations from these arrangements have been identified and justified.

Furthermore, the following plans and policies may be relevant to this plan and should be considered concurrently:

- *State Disaster Mitigation Plan including Disaster Adaptation Plans*
- *State Level Emergency Risk Assessment*
- *Flood Risk Management Manual*
- *NSW State Rescue Policy*
- *Evacuation Management Guidelines*
- *NSW Recovery Plan*
- *Other sub and supporting plans available at NSW Government - Rescue and emergency management*

Supplementary and supporting material of the NSW State Flood Plan is maintained on the NSW SES website at: <https://www.ses.nsw.gov.au/about-us/flood-storm-and-tsunami-plans/>. This material includes:

- *Flood hazard and risk in NSW.*
- *Provision and requirements for flood warning in NSW.*
- *NSW State Plan Glossary.*
- *NSW SES Resupply Flowchart.*
- *Coastal and inland river basin maps.*

Further information on flood hazard and warning is located on the following websites:



- Australian Institute for Disaster Resilience (AIDR)
<https://knowledge.aidr.org.au/resources/handbook-flood-emergency-planning/>
- NSW SES website <https://www.ses.nsw.gov.au/disaster-tabs-header/flood/>
- NSW SES Warnings page <https://www.ses.nsw.gov.au/about-us/our-warnings/>

5.3 2021 Hunter-Central Coast Regional Emergency Management Plan

The 2021 Hunter-Central Coast Regional Emergency Management Plan details arrangements for, prevention of, preparation for, response to and recovery from emergencies within the emergency management areas covered in this plan. It encompasses arrangements for:

- emergencies controlled by Combat Agencies
- emergencies controlled by Combat Agencies and supported by the Regional Emergency Operations Controller (REOCON)
- emergency operations for which there is no Combat Agency and are therefore controlled by the REOCON
- circumstances where a Combat Agency has passed control to the REOCON.
- demobilisation and transition of control from response to recovery

As described by the Plan:

The objectives of this plan are to:

- *support Local Emergency Management Plans (EMPLANs) and augment them when required;*
- *identify trigger points for regional level activation, escalation and demobilisation;*
- *define participating organisation and Functional Area roles and responsibilities in preparation for, response to and recovery from emergencies;*
- *set out the control, co-ordination, support and liaison arrangements at the Regional level;*
- *detail activation and alerting arrangements for involved agencies at the Regional level; and*
- *detail arrangements for the acquisition and co-ordination of resources at the Regional level*

The plan describes the arrangements at regional level to prevent, prepare for, respond to and recover from emergencies. The plan also provides policy direction for the preparation of sub plans and supporting plans.

- *This plan relies on effective implementation of the Governance framework for Emergency Management;*
- *Arrangements detailed in this plan are based on the assumption that the resources upon which the plan relies are available when required; and*
- *The effectiveness of arrangements detailed in this plan are dependent upon all involved agencies preparing, testing and maintaining appropriate internal instructions, and/or standing operating procedures*



5.4 2022 City of Newcastle Flood Emergency Sub Plan

As described by the Plan:

Purpose

The purpose of this plan is to set out the multi-agency arrangements for the emergency management of flooding in the City of Newcastle Local Government Area (LGA).

Activation

This plan does not require activation. The arrangements set out in this plan are always active.

The City of Newcastle Emergency Management Plan (EMPLAN) is active at all times in anticipation of the need to coordinate support and resources requested by combat agencies, including the NSW State Emergency Service (NSW SES).

Scope

.... The Council area is in the NSW SES Northern Zone and for emergency management purposes, is part of the Hunter Central Coast Emergency Management Region.

..... The plan sets out the City of Newcastle level of emergency management arrangements for prevention, preparation, response and initial recovery for flooding in the City of Newcastle. Hazard and Risk information can be found in Volume 2 of this document, and NSW SES Response Arrangements can be found in Volume 3t.

In this plan a flood is defined as a relatively high water level which overtops the natural or artificial banks in any part of a stream, river, estuary, lake or dam, and/or local overland flooding associated with drainage before entering a watercourse, and/or coastal inundation resulting from super-elevated sea levels and/or waves (including tsunamis) overtopping coastline defences.

Key Principles

The protection and preservation of human life (including the lives of responders and the community) is the highest priority.

Evacuation is the primary response strategy for people impacted by flooding.

Roles and Responsibilities

General responsibilities of emergency service organisations and functional areas are set out in the NSW State EMPLAN and NSW State Flood Sub Plan.

Specific roles and responsibilities for agencies, functional areas and organisations in relation to flooding within City of Newcastle are detailed within this plan, Appendix B and Appendix C.



5.5 City of Newcastle Website

Council's website includes a range resources to prepare for emergencies and natural hazards which can be accessed at:

[Emergencies - City of Newcastle](#)

Resources are available, in part, under the following headings:



Emergency Contacts

Find out who to contact in the event of an emergency or natural disaster, and where to go to stay informed.



Preparing for an Emergency

Know your risk for an emergency or natural disaster to occur, and plan now for what you will do.



During an Emergency

Learn how to stay informed and stay safe during an emergency or natural disaster.



Recovering from an Emergency

Find resources and support to help you recover after an emergency or natural disaster has occurred.



Newcastle Disaster Dashboard

Discover real-time, local emergency information and recovery resources.



Flood Alerts and Information

Know what to do before, during and after a flood. Register for our free flood alert service and be prepared.

Council provides a list of emergency contacts at: [Emergency Contacts - City of Newcastle](#)

Council also provides a Flood Alert Service which requires any interested person or organisation to sign up to be notified in case of an emergency. Visit: [Flooding - City of Newcastle](#)

6 Flood Emergency Response

It is expected that Building Owners and Managers (in accordance with existing OH&S requirements, the Building Code of Australia and relevant City of Newcastle Council regulations) are to have a building Emergency Management Plan which complies with the provisions of AS 3745.

6.1 Flood Risks

6.1.1 Flood Levels, Depths, Velocities and Hazards

The estimated flood extents and levels, flood depths, flood velocities and flood hazards under Future Conditions are described in Section 4.1 and are mapped in the Figures attached in **Appendix B**.

The flood levels at 7 reference locations (identified in **Figure 11**) in the 1% AEP, 1% AEP in 2050, 1% AEP in 2100 floods and the PMF are summarised in **Table 3**.

Table 3 Flood Levels at Reference Locations under Benchmark Conditions

ID	1% AEP (m AHD)	1% AEP in 2050 (m AHD)	1% AEP in 2100 (m AHD)	PMF (m AHD)
H1	1.41	1.86	2.36	1.48
H2	2.16	2.29	2.58	3.22
H3	2.16	2.29	2.58	3.23
H4	dry	dry	dry	3.30
H5	dry	dry	dry	3.22
H6	dry	dry	dry	3.29
H7	2.16	2.29	2.58	3.22

Source: 2024 Throsby, Styx & Cottage Creek Flood Study

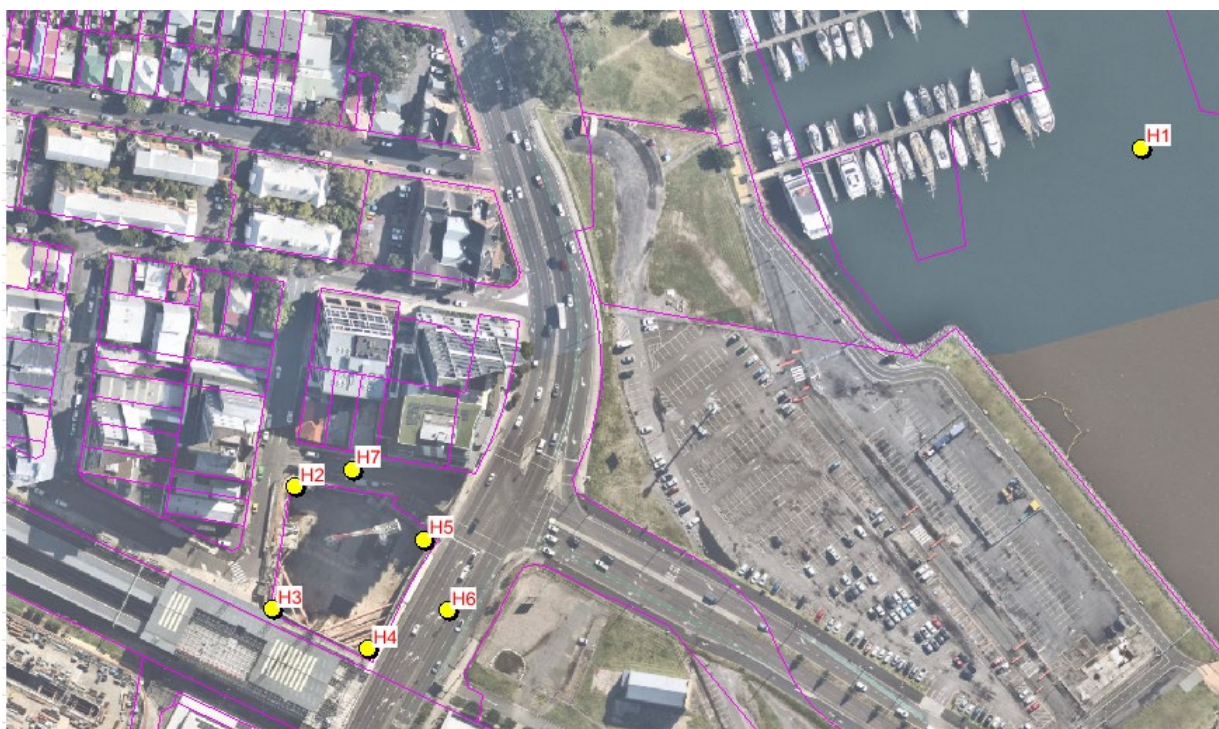


Figure 11 Reference Locations

6.1.2 Rate of Rise of Floodwaters

To understand the likely warning times and associated response times to flooding of the basement levels during extreme flood events it is necessary to estimate the expected rate of rise of floodwaters and the rate and volume of inflows.

While the driveway crest level is set at the 1% AEP flood level + 500 mm freeboard and is compliant with Control C-3 under 8.0 Management of risk to property in Section B1(b) Flood Management of the Newcastle DCP 2023, this freeboard would be overwhelmed in a PMF (1 in 10,000,000 AEP) event. The 4 hour PMF is estimated to reach a level of 3.3 m AHD ie. 0.5 m higher than the driveway crest level.

Based on the representative spill level of 2.80 m AHD to initiate flow down the driveway (assuming that the ingress of floodwaters via any other vents or lift shafts is limited) it is estimated that in a 4 hour PMF event that the onset of flows down the car park ramps would occur around 2 hours 15 minutes after start of the PMP storm.

The rates of filling of each level of the basement car parking was estimated using a simple hydraulic model of flows down the access ramps. For the case of the 4 hour PMF, the estimated times it would take to fill each level of the car park to a depth of 0.9 m and to a depth of 2.5 m is summarised in **Table 4**.

Table 4 Indicative Time for Basement Levels to Fill once the Driveway Crest is Overtopped in a 4 hour PMF

	Basement FFL (m AHD)	Time (mins) to reach 0.9 m flood depth in basement	Time (mins) to reach 2.5 m flood depth in basement
Basement 03	-6.25	80	110
Basement 02	-3.30	120	140
Basement 01	-0.35	150	190

In events less extreme than the PMF but of sufficient severity to overtop the driveway crest level (greater than a 1 in 30,000 AEP event under current conditions) and where the inflow volume is less than the storage volume in the car parking levels then the same flooding behaviour would be expected with flooding initially occurring on all three levels but at the time inflows cease floodwaters would then continue to flow down the access ramps until the flood level in the car park reaches its maximum level (ie. the basement levels would fill progressively from Basement 03 like a bath tub).

6.1.3 Pedestrian and Vehicular Stability in Floods

The latest edition of Australian Rainfall and Runoff released in 2019 provides guidance on both pedestrian and vehicle stability in floods as does the 2023 Flood Risk Management Guideline FB03 released on 30 June 2023 by NSW DPE.

Pedestrian Stability

The 2023 Flood Risk Management Guideline FB03 released on 30 June 2023 by NSW DPE includes a plot of thresholds for the stability of people in floods (see **Figure 12**).

Vehicle Stability

The 2023 Flood Risk Management Guideline FB03 released on 30 June 2023 by NSW DPE includes a plot of thresholds for vehicle stability in floods (see **Figure 13**).



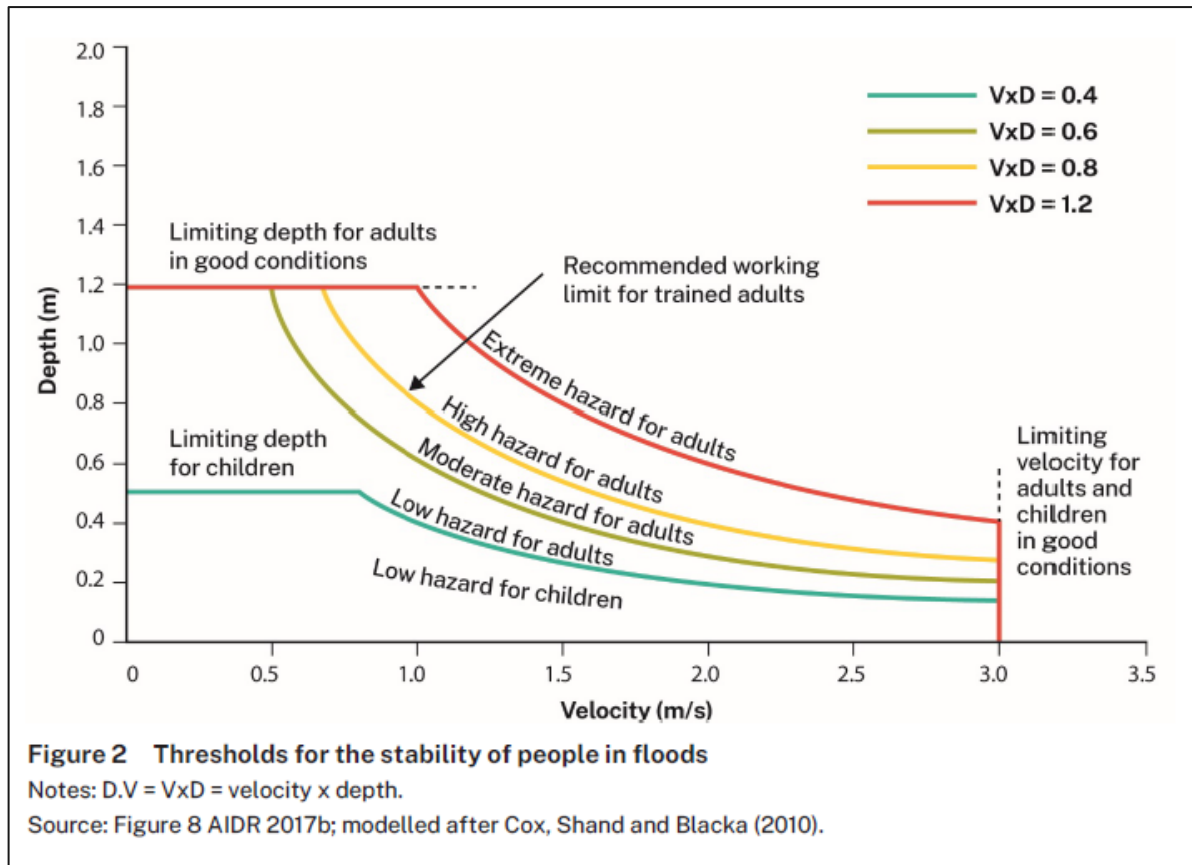


Figure 12 Thresholds for Pedestrian Stability (Source: 2023 FRM Guideline FB03)

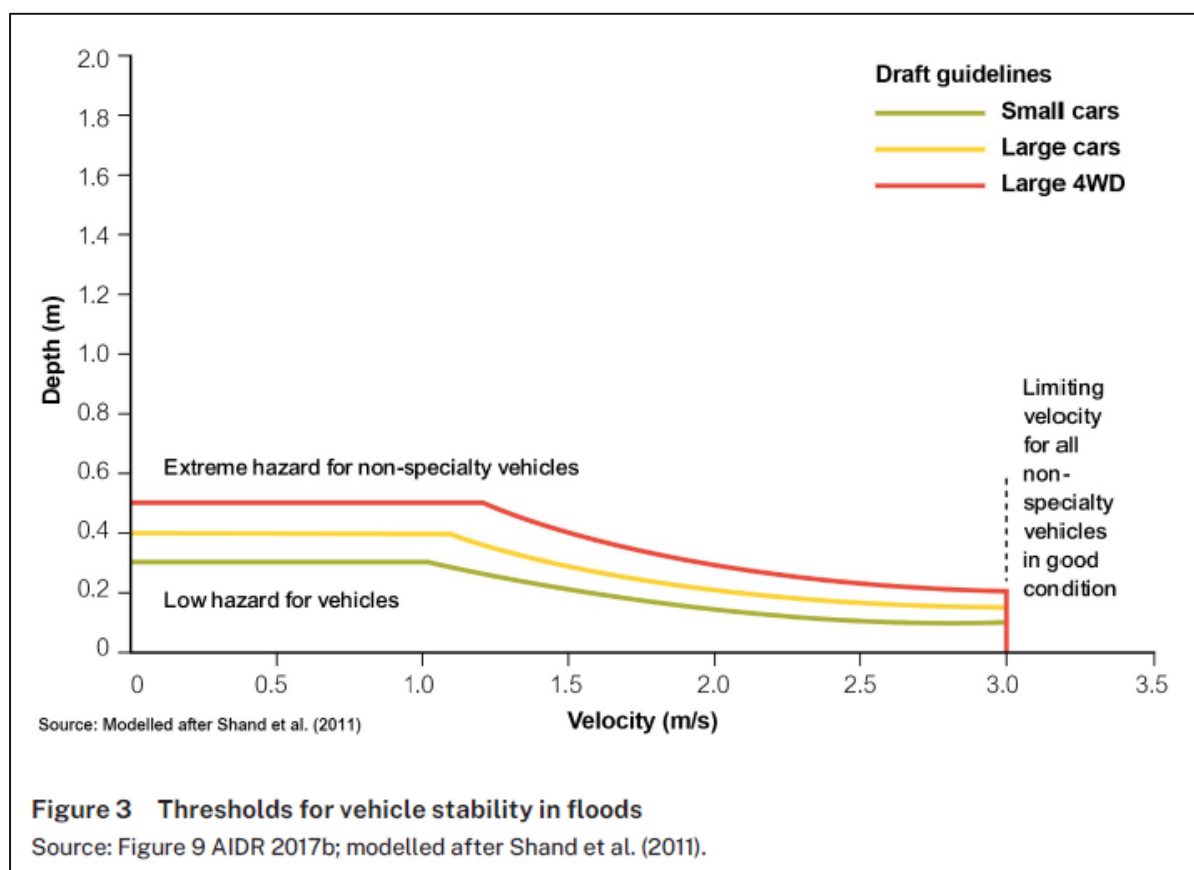


Figure 13 Thresholds for Vehicle Stability (Source: 2023 FRM Guideline FB03)

H1 and H2 categories have been adopted as representative categories for vehicular stability respectively for small vehicles and large vehicles (see **Figure 8**).

Overland Flow Flood Conditions

Under overland flow flood conditions in the 1% AEP in 2050, PMF 4 hour and PMF 6 hour events the following results are plotted at reference locations H2, H3, H4, H5, H6 and H7 and attached in **Appendix F**:

- (iv) The variation in flood depths;
- (v) The variation in flood hazard in comparison to flood hazard categories (refer to **Figure 8**);
- (vi) The variation in flood hazard in comparison to pedestrian stability limits.

Indicative Onset and Duration of Unsafe Conditions

A comparison of thresholds for Pedestrian and Vehicle Safety are plotted in **Figure 14**. It is noted that overland flow that is classified as H5 hazard category may be safe for pedestrian even if the velocity exceeds 2 m/s and is less than 3 m/s subject to the depth of flow being sufficiently shallow.

The indicative durations of unsafe conditions for small vehicles, large vehicles, children and adults are summarised in **Table 5** while the elapsed time to reach unsafe conditions are summarised in **Table 6**.

It should be also noted that a blank cell in **Table 5** denotes either:

- (i) no inundation (refer **Table 3**) or
- (ii) inundation is present but it does not exceed the applicable stability limits

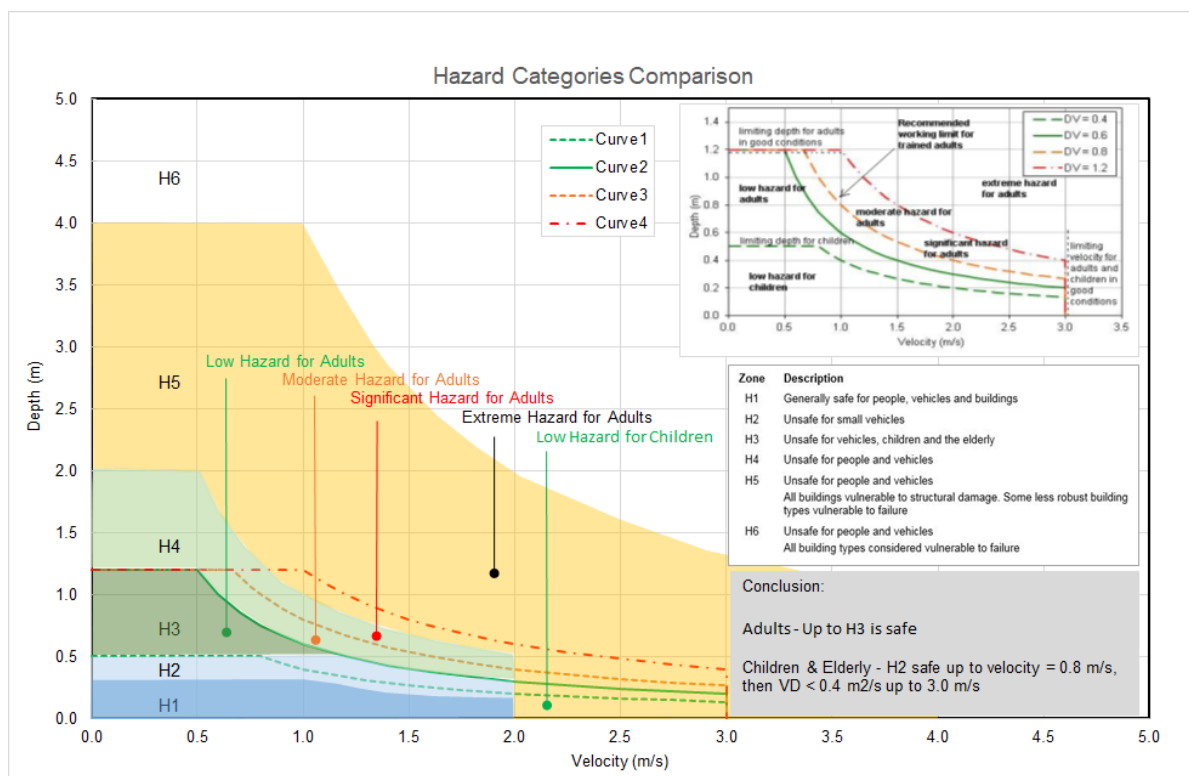


Figure 14 Comparison of Thresholds for Pedestrian and Vehicle Stability



Table 5 Duration of Unsafe Conditions for Small and Large Vehicles, Children and Adults at Reference Locations

		Duration (hours) it is Unsafe for:			
Event - Location	Maximum Hazard	Small Vehicles	Large Vehicles	Children	Adults
1% AEP in 2050		1% AEP in 2050			
H2 - 1% AEP in 2050	H3	12.0	5.9	5.9	
H3 - 1% AEP in 2050	H3	12.0	6.0	6.0	
H4 - 1% AEP in 2050					
H5 - 1% AEP in 2050					
H6 - 1% AEP in 2050					
H7 - 1% AEP in 2050	H3	7.3	2.8	2.8	
PMF 4 hrs		PMF 4hrs			
H2 - PMF 4 hrs	H4	11.5	11.3	11.3	5.4
H3 - PMF 4 hrs	H4	11.5	11.3	11.3	5.4
H4 - PMF 4 hrs	H3	4.8	3.8	3.8	
H5 - PMF 4 hrs	H2	2.3			
H6 - PMF 4 hrs	H2	1.8			
H7 - PMF 4 hrs	H4	11.4	11.3	11.3	4.2
PMF 6 hrs		PMF 6 hrs			
H2 - PMF 6 hrs	H4	11.3	11.2	11.2	6.0
H3 - PMF 6 hrs	H4	11.3	11.2	11.2	6.3
H4 - PMF 6 hrs	H3	5.8	4.3	4.3	
H5 - PMF 6 hrs	H2	2.3			
H6 - PMF 6 hrs	H2	1.7			
H7 - PMF 6 hrs	H4	11.2	11.0	11.0	4.8

Exceeds the duration above - see Flood Depth Plots

Table 6 Elapsed Time to reach Unsafe Conditions for Small and Large Vehicles, Children and Adults at Reference Locations

		Elapsed Time from Start of Storm Burst until Unsafe Conditions Reached (hours):			
Event - Location	Maximum Hazard	Small Vehicles	Large Vehicles	Children	Adults
1% AEP in 2050		1% AEP in 2050			
H2 - 1% AEP in 2050	H3	0.0	0.3	0.4	
H3 - 1% AEP in 2050	H3	0.0	0.3	0.3	
H4 - 1% AEP in 2050					
H5 - 1% AEP in 2050					
H6 - 1% AEP in 2050					
H7 - 1% AEP in 2050	H3	0.3	1.3	1.3	
PMF 4 hrs		PMF 4hrs			
H2 - PMF 4 hrs	H4	0.6	0.8	0.8	1.9
H3 - PMF 4 hrs	H4	0.6	0.8	0.8	1.9
H4 - PMF 4 hrs	H3	2.3	2.6	2.6	
H5 - PMF 4 hrs	H2	3.2			
H6 - PMF 4 hrs	H2	3.3			
H7 - PMF 4 hrs	H4	0.7	0.8	0.8	2.4
PMF 6 hrs		PMF 6 hrs			
H2 - PMF 6 hrs	H4	0.8	1.0	1.0	2.7
H3 - PMF 6 hrs	H4	0.8	1.0	1.0	2.5
H4 - PMF 6 hrs	H3	2.8	3.3	3.3	
H5 - PMF 6 hrs	H2	4.2			
H6 - PMF 6 hrs	H2	4.7			
H7 - PMF 6 hrs	H4	1.0	1.2	1.2	3.2

It is noted that the Hannell Street frontage of the property (Locations H4 and H5) and Hannell Street either do not experience unsafe conditions or if unsafe conditions are experienced they are for a shorter period of time compared to conditions at Locations H3, H2 or H7. Consequently any emergency access to the development during major and extreme floods should be via Hannell Street.

6.2 Flood Warning

Council provides a Flood Alert Service which requires any interested person or organisation to sign up to be notified in case of an emergency. Visit: [Flooding - City of Newcastle](#)

Other sources of information regarding approaching severe weather conditions which could cause potential flooding at the site including:

- The Bureau of Meteorology through their website (www.bom.gov.au);
- The Hazards Near Me app ([Hazards Near Me app | NSW Government](#));
- Observation of local rainfall;
- The NSW SES ([Homepage | NSW SES](#));
- City of Newcastle Disaster Dashboard ([Disaster Dashboard](#));
- Local television stations; and/or
- Local radio stations.

An important indication of likely imminent flood activity would be intense local rainfall and residents; retail workers and visitors should take notice of extreme rainfall warnings issued by the Bureau of Meteorology and disseminated by local media.

Council provides a list of emergency contacts at: [Emergency Contacts - City of Newcastle](#)

6.3 Flood Evacuation

6.3.1 Flood Refuge

Section 9.0 Management of risk to life in the Newcastle DCP 2023 sets out the following controls:

C-4. On-site refuge

On-site refuge is to be provided for all development where the risk to life category is L3 or higher unless:

- a. the proposed development is less than 40m from the perimeter of the PMF extent and the higher ground is accessible, or*
- b. the proposed use is defined as commercial premises or industry in which case onsite refuge is only required where the hazard category is L4 or higher.*

As identified in Council's Flood Certificate (refer **Table 2** and **Appendix D**) the Highest Life Risk Category is L4 (H4) under local catchment flooding conditions and an on-site flood refuge is required.

The designated flood refuge is the hotel amenity facilities on Level 06. There is 1,019 m² of GFA on this level. UPG have estimated that up to 55 persons may be present in retail spaces on the ground floor. This would require an available refuge area of 55 x 2 m² per person = 110 m². It is concluded that the hotel amenity facilities offer an ample area for flood refuge.



6.3.2 Flood Evacuation

Vertical evacuation (shelter-in-place) is proposed for this building. All hotel staff, hotel guests, other workers, residents and visitors located on Level 1 or higher should remain in place unless directed to evacuate by NSW SES.

In the event that lifts cease to operate (for safety reasons or due to loss of power during a major storm) the central stairs provide an evacuation route from the basement levels up to Level 06.

All retail areas on the ground floor and the Residential Lobby have back-of house access to the central stairs. Any persons evacuating from the Co-living Lobby or the Hotel Lobby can access the central stairs by first walking up to the Mezzanine Level.

6.4 Draft Flood Emergency Response Plan

The building Emergency Management Plan will contain a Flood Emergency Response Plan. It is also expected that all wardens trained under the building emergency plan are to be aware of the actions to be implemented in an extreme flood, trafficable routes to the site during extreme floods and how to liaise with the any building occupants on the site.

In 2022 Epicentre Consulting Engineers prepared a Flood Emergency Response Plan (FERP) for the mixed-use development at 10 Dangar Street, Wickham (Lot 1 DP1197377) (see **Appendix G**).

If required an updated Flood Emergency Response Plan could be prepared prior to issue of a CC.

The FERP could describe:

- Flood behaviour at the site for the 20% AEP, 1% AEP , 1% AEP in 2050 and 1% AEP in 2100 floods and the Probable Maximum Flood (PMF),
- Any flood protection measures including signage to warn residents/staff/visitors on site of the potential for flooding of the building environs in major to extreme storms, and
- Evacuation strategy, measures and procedures; and
- A sample plan template for an Emergency Business Continuity Plan for retails outlets located on the ground floor (Level 00)

Any updated Plan would be informed by the considerations identified in the 2022 FERP.



7 Planning Considerations

7.1 Newcastle Local Environmental Plan 2012

This FIRA addresses the flooding considerations identified in Section 5.21 Flood Planning of the Newcastle LEP 2009 as set out in **Table 7** below.

Table 7 Newcastle LEP 2012 Clause 5.21 Compliance Assessment

Clause	Consideration	Compliance Assessment	
(1) The objectives of this clause are as follows:			
	(a) to minimise the flood risk to life and property associated with the use of land.	Yes	The proposed development minimises the flood risk to life and property through the built form and by locating all habitable rooms above the PMF level.
	(b) to allow development on land that is compatible with the flood function and behaviour on the land, taking into account projected changes as a result of climate change.	Yes	The proposed development is located outside Council's mapped floodway. The negligible impacts of the proposed development on flooding are described in Section 4.2 of this FIRA. The City of Newcastle has included climate change in its Defined Flood Event (DFE) which is assessed in this FIRA..
	(c) to avoid adverse or cumulative impacts on flood behaviour and the environment,	Yes	The impacts of the proposed development on flooding including flood levels, velocities, hazards are described in Section 4.2 of this FIRA. It is noted that the proposed development is redevelopment of a previously developed property and therefore avoids cumulative impacts.
	(d) to enable the safe occupation and efficient evacuation of people in the event of a flood	Yes	All habitable rooms in the proposed development are located higher than the PMF level. The measures set out in this report and discussed in Section 6 demonstrate how the risk to life is managed in the event of a flood.
(2) Development consent must not be granted to development on land the consent authority considers to be within the flood planning area unless the consent authority is satisfied the development:			
	(a) is compatible with the flood function and behaviour on the land	Yes	Based on the previous approved development which did not include provision for flood storage within the building footprint, the impacts on flooding including flood levels, velocities, hazards and storage of the proposed development without any flood storage (except for inundation of the loading dock area which provides around 80 m3 in the % AEP in 2050 flood) are described in Section 4.2.1, 4.2.2 and 4.2.3. It was concluded that the proposed development without any flood storage except for the loading dock has a negligible adverse impact on flood levels, velocities and hazards.
	(b) will not adversely affect flood behaviour in a way that results in detrimental increases in the potential flood affectation of other development or properties, and	Yes	The negligible impacts of the proposed development on flooding are described in Section 4.2 of this FIRA.

	(c) will not adversely affect the safe occupation and efficient evacuation of people or exceed the capacity of existing evacuation routes for the surrounding area in the event of a flood, and	Yes	Safe occupation is achieved by locating all habitable rooms above the PMF level. The measures set out in this report and discussed in Section 6 demonstrate how the risk to life is managed in the event of a flood.
	(d) incorporates appropriate measures to manage risk to life in the event of a flood, and	Yes	The measures set out in this report and discussed in Section 6 demonstrate how the risk to life is managed in the event of a flood.
	(e) will not adversely affect the environment or cause avoidable erosion, siltation, destruction of riparian vegetation or a reduction in the stability of riverbanks or watercourses.	Yes	The impacts of the proposed development on flooding including flood levels, velocities, hazards are described in Section 4.2 of this FIRA.
3) In deciding whether to grant development consent on land to which this clause applies, the consent authority must consider the following matters—			
	(a) the impact of the development on projected changes to flood behaviour as a result of climate change	Yes	The City of Newcastle has included climate change in its Defined Flood Event (DFE) (1% AEP in 2050) which is assessed in this FIRA. The 1% AEP in 2100 flood is also assessed.
	(b) the intended design and scale of buildings resulting from the development	Yes	The intended design and scale of building is consistent with the <i>Wickham Master Plan 2017</i> which identified the site as a strategically significant location for increased development capacity and the <i>Wickham Master Plan 2021 Update</i> (PP-2021-1506) which was further refined in the 2022 amendment, which supported additional incentive-based planning controls.
	(c) whether the development incorporates measures to minimise the risk to life and ensure the safe evacuation of people in the event of a flood.	Yes	The proposed development minimises the flood risk to life and property through the built form which has negligible adverse impact on flood levels, velocities and hazards and by locating all habitable rooms above the PMF level.
	(d) the potential to modify, relocate or remove buildings resulting from development if the surrounding area is impacted by flooding or coastal erosion.	Yes	The negligible impacts of the proposed development on flooding are described in Section 4.2 of this FIRA.

This FIRA addresses the flooding considerations identified in Section 5.22 Special Flood Considerations of the Newcastle LEP 2012 as set out in **Table 8** below.

Table 8 Newcastle LEP 2012 Clause 5.22 Compliance Assessment

Clause	Consideration	Compliance Assessment	
(1) The objectives of this clause are as follows:			
	(a) to enable the safe occupation and evacuation of people subject to flooding,	Yes	Safe occupation is achieved by locating all habitable rooms above the PMF level. The measures set out in this report and discussed in Section 6 demonstrate how the risk to life is managed in the event of a flood.
	(b) to ensure development on land is compatible with the land's flood behaviour in the event of a flood,	Yes	The proposed development responds to the flood risks experienced on the subject property through the built form which has negligible adverse impact on flood levels, velocities and hazards and by locating all habitable rooms above the PMF level.



	(c) to avoid adverse or cumulative impacts on flood behaviour,	Yes	The impacts of the proposed development on flooding including flood levels, velocities, hazards are described in Section 4.2 of this FIRA. It is noted that the proposed development is redevelopment of a previously developed property and therefore avoids cumulative impacts.
	(d) to protect the operational capacity of emergency response facilities and critical infrastructure during flood events	Yes	It is proposed that retail workers and patrons on the ground floor at the time a major flood commences to retreat to the flood refuge area on Level 06. It is proposed the hotel staff and guests remain on Levels 01 to 05 until any flooding subsides. It is proposed that any residents and any visitors shelter in place in the existing spaces on the level on which they are located. The proposed development will not adversely impact on the operational capacity of emergency response facilities and critical infrastructure during floods.
	(e) to avoid adverse effects of hazardous development on the environment during flood events	Yes	The impacts of the proposed development on flooding including flood levels, velocities, hazards and storage are described in Section 4.2 of this FIRA..
(2) This clause applies to			
	(a) for sensitive and hazardous development—land between the flood planning area and the probable maximum flood, and	Yes	The mixed use development comprising ground floor retail uses, hotel, residential and co-living housing is not classified as sensitive or hazardous development.
	(b) for development that is not sensitive and hazardous development—land the consent authority considers to be land that, in the event of a flood, may— (i) cause a particular risk to life, and (ii) require the evacuation of people or other safety considerations	Yes	The measures set out in this report and discussed in Section 6 demonstrate how the risk to life is managed in the event of a flood.
3) Development consent must not be granted to development on land to which this clause applies unless the consent authority has considered whether the development —			
	(a) will affect the safe occupation and efficient evacuation of people in the event of a flood, and	Yes	The proposed development minimises the flood risk to life and property through the built form and by locating all habitable rooms above the PMF level. It is proposed that retail workers and patrons on the ground floor at the time a major flood commences to retreat to the flood refuge area on Level 06. It is proposed the hotel staff and guests remain on Levels 01 to 05 until any flooding subsides. It is proposed that any residents and any visitors shelter in place in the existing spaces on the level on which they are located.
	(b) incorporates appropriate measures to manage risk to life in the event of a flood, and	Yes	The measures set out in this report and discussed in Section 6 demonstrate how the risk to life is managed in the event of a flood.

	c) will adversely affect the environment in the event of a flood	Yes	The impacts of the proposed development on flooding including flood levels, velocities and hazards are described in Section 4.2 of this FIRA. It is noted that the proposed development is redevelopment of a previously developed property in an area of existing development and will not adversely affect the environment.
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7.2 Newcastle DCP 2023

As advised by the Newcastle DCP 2023, in part:

DCP 2023 has seven parts each containing objectives and controls that apply to all development. Development applications need to consider each part and respond to relevant provisions

B: Site planning controls - Sets out controls for all development. Part B contains objectives and controls that underpin orderly and sustainable development.

Section B1(b) Flood Management of the Newcastle DCP 2023:

applies to all development on flood prone (flood liable) land where flood mapping after the release of the 2019 Australian Rainfall and Runoff Guidelines (ARR 2019) is available, including:

- (vi) *Land that is flood prone due to flooding from the Throsby, Cottage or Styx creek catchments (refer Post 2019 Flood Study area), and*

The assessment of compliance with the Newcastle DCP 2023, which has been based on proposed flood mitigation measures incorporated into the development and the resulting flood impacts which are described in **Section 4.2**, is set out in **Table 9** as follows.

Table 9 Newcastle DCP 2023 Section B1(b) Flood Management Compliance Assessment

Control / Requirement	Compliance Assessment	
5.0 Application Requirements		
A Statement of Environmental Effects and/or layout plans submitted to support a development application (DA) shall include wording and where relevant, calculations, demonstrating that the controls of this section of DCP 2023 have been addressed.	Yes	This FIRA report satisfies this requirement. Refer also to Table 5, 6 and 7.
6.0 Floodways		
C-1.No building or structure can be built, and no land can be filled with any materials in areas identified as floodways, except for small changes to ground levels that do not significantly change the flow patterns for: a. roads b. parking c. below ground structures d. landscaping	N/A	The proposed development is located outside Council's mapped floodway. This is not an applicable consideration.



C-2.Where dividing fences across floodways are unavoidable, they are constructed only of open type fencing that does not restrict the flow of flood waters and are resistant to blockage. New development is designed to avoid fences in floodways.	N/A	The proposed development is located outside Council's mapped floodway. This is not an applicable consideration.
7.0 Flood Storage Areas		
C-1.Not more than 20% of the area of any development site in a flood storage area is filled. The remaining 80% is generally developed allowing for underfloor storage of floodwater by the use of suspended floor techniques such as pier and beam construction. Where a development is proposing to build over more than 20% of the site area, the portion of the structure being suspended is to have a floor level at the FPL as a minimum. As part of the structure's design, it must allow water to flow freely into and out of the underfloor area and must not be restricted by solid cladding or similar around the perimeter of the structure below the floor level.		The estimated flood storage under pre-development (Benchmark) Conditions in the 1% AEP flood in 2050 is mapped in Figure 9 . The estimated flood storage under Benchmark Conditions in the 1% AEP in 2050 flood is 571 m ³ . Based on the previous approved development which did not include provision for flood storage within the building footprint, the impacts on flooding including flood levels, velocities, hazards and storage of the proposed development without any flood storage (except for inundation of the loading dock area which provides around 80 m ³ in the % AEP in 2050 flood) are described in Section 4.2. It was concluded that the proposed development without any flood storage except for the loading dock has a negligible adverse impact on flood levels, velocities and hazards.
C-2.Where it is proposed to fill development sites, the fill does not impede the flow of ordinary drainage from neighbouring properties, including overland flow.	Yes	The proposed development does not impede the flow of ordinary drainage from neighbouring properties, including overland flow.
8.0 Management of risk to property		
C-1.Floor levels of all occupiable rooms of all buildings are not set lower than the FPL.	Yes	The floor levels of the ground floor hotel lobby and ground floor retail spaces are set at the FPL.
C-2.Garage floor levels are no lower than the 1% 2050 AEP event. However, it is recognised that in some circumstances this may be impractical due to vehicular access constraints. In these cases, garage floor levels are as high as practicable.	N/A	Basement car parking only is proposed. This is not an applicable consideration.
C-3.Basement garages may be acceptable where all potential water entry points are at or above the probable maximum flood (PMF), excepting that vehicular entry points can be at the FPL. In these cases, explicit points of refuge are accessible from the carpark in accordance with the controls for risk to life set out below.	Yes	The driveway crest level is set at the FPL. The basement car parking levels are subject to flooding in extreme floods where the flood level in Dangar Street rises above the FPL. For the case of the 4 hour PMF, the estimated times it would take to fill each level of the car park to a depth of 0.9 m and to a depth of 2.5 m is summarised in Table 4 . In the event that lifts cease to operate (for safety reasons or due to loss of power during a major storm) the central stairs provide an evacuation route from the basement levels up to the designated flood refuge area on Level 06.
C-4.Electrical fixtures such as power points, light fittings and switches are sited above the FPL unless they are on a separate circuit (with earth leakage protection) to the rest of the building.	Yes	To be noted by electrical services designer.

C-5.Swimming pools are to be located to ensure they are not inundated from minor flooding events. Electrical connections and fixtures around swimming pools are to be sited at the FPL.	Yes	An indoor fitness / pool area is located on Level 06 which is multiple levels higher than the PMF level.
C-6.Where parts of the building are proposed below the FPL, they are constructed of water-resistant materials.	Yes	This requirement is noted
C-7.Areas where cars, vans and trailers are parked, displayed or stored are only located in areas subject to property hazard of P1. Containers, bins, hoppers and other large floatable objects are not to be stored in these areas. Heavy vehicle parking areas can only be located in locations subject to P1 or P2 categories.		Cars are parked in basement car parking levels which comply with C-3 above. Bins temporarily stored in the loading dock area for emptying would be subject to 0.01 m flood depth in the 1% AEP flood (H1) and 0.15 m flood depth in the 1% AEP in 2050 flood (H1).
C-8.Timber framed, light steel construction, cavity brickwork and other conventional domestic building materials are generally suitable forms of construction where the property hazard is P1 to P4.	Yes	This requirement is noted.
C-9.Property hazard of P5 is generally unsuitable for building construction and building is discouraged from these areas. Where building is necessary, the structure is certified by a practising structural engineer to withstand the hydraulic loads (including debris) induced by the flood waters.	Yes	The highest property risk category is lower than P5.
C-10.Property hazard of P6 is unsuitable for any type of building construction	Yes	The highest property risk category is lower than P5.

9.0 Management of Risk to Life

C-1.Risk to life category L5 is generally unsuitable for building construction and building is discouraged from these areas. Reliable safe escape to high ground is likely not possible and normal building construction would likely suffer structural failure from the force of floodwaters, so that any people seeking refuge in the building would likely perish. Where building is necessary, the structure is certified by a practising structural engineer to withstand the hydraulic loads (including debris) induced by the flood waters.	Yes	The Highest Life Risk category is lower than L5. The proposed development is a 43 storey mixed use tower which will undergo rigorous structural design. If necessary a certification from a practising structural engineer of the capacity of the tower to withstand the hydraulic loads (including debris) induced by flood waters up to 1.5 m deep in the PMF will be provided during the CC stage.
C-2.Risk to life category of L6 is unsuitable for any type of building construction	N/A	The Highest Life Risk category is lower than L5. This is not an applicable consideration.
C-3.Islands - The formation of islands in the floodplain during a flood is a potentially dangerous situation, especially when floods larger than the FPL totally inundate the island for an extended period. Development of such land is considered with great care.	Yes	The indicative durations of unsafe conditions for small vehicles, large vehicles, children and adults in the vicinity of the proposed development are summarised in Table 4 while the elapsed time to reach unsafe conditions are summarised in Table 5. The measures set out in this report and discussed in Section 6 demonstrate how the risk to life is managed in the event of a flood.



C-4. On-site refuge On-site refuge is to be provided for all development where the risk to life category is L3 or higher unless: a. the proposed development is less than 40m from the perimeter of the PMF extent and the higher ground is accessible, or b. the proposed use is defined as commercial premises or industry in which case onsite refuge is only required where the hazard category is L4 or higher.	Yes	The Highest Life Risk category is L4. The designated flood refuge is the hotel amenity facilities on Level 06.
C-5. Standards for on-site refuge Where on-site refuge is required for a development, it should comply with the following minimum standards: a. the minimum on-site refuge level is the level of the PMF. On-site refuges are designed to cater for the number of people reasonably expected on the development site and are provided with emergency lighting b. on-site refuges are of a construction type able to withstand the effects of flooding. Design certification by a practising structural engineer that the building is able to withstand the hydraulic c. loading due to flooding (at the PMF).	Yes	The designated flood refuge is the hotel amenity facilities on Level 06 multiple levels higher than the PMF level. There is 1,019 m² of GFA on this level. UPG have estimated that up to 55 persons may be present in retail spaces on the ground floor. This would require an available refuge area of 55 x 2 m² per person = 110 m². It is concluded that the hotel amenity facilities offer an ample area for flood refuge. The proposed development is a 43 storey mixed use tower which will undergo rigorous structural design. If necessary a certification from a practising structural engineer of the capacity of the tower to withstand the hydraulic loads (including debris) induced by flood waters up to 1.5 m deep in the PMF will be provided during the CC stage.
C-6. Emergency egress procedure for basements A plan is developed detailing emergency egress procedures during a flood, as well as any refuge areas in reasonable proximity of the development. The plan is to be positioned in the basement car park in an easily recognisable location/s. Refer to Figure B1(b).03.	Yes	The measures set out in this report and discussed in Section 6 demonstrate how the risk to life is managed in the event of a flood.

7.3 Conclusion

It is concluded that the proposed development complies with the flooding requirements of the Newcastle LEP 2012 and the intent of the Newcastle DCP 2023.



8 Summary and Conclusions

This Flood Impact Risk Assessment is submitted to the Department of Planning, Housing and Infrastructure (DPHI) on behalf UPG Wickham Pty Ltd (the Applicant), to support a State Significant Development Application (SSDA) and concurrent Rezoning Report for the construction of a 43-storey mixed-use development at 10 Dangar Street, Wickham (the site). The site is located within the Newcastle local government area (LGA) and occupies a prominent corner position immediately north of the Newcastle Interchange.

To facilitate the proposed development described in Section 1.4.2, a concurrent Rezoning Proposal is sought to make the following amendments to the *Newcastle Local Environmental Plan 2012* (Newcastle LEP 2012) in relation to the site:

- Amend Clause 7.9 to permit a maximum building height of RL 152m on the site; and,
- Amend the Clause 7.9A to permit a maximum FSR of 14.4:1 on the site.

The proposed amendments to the Newcastle LEP 2012, as outlined above, will facilitate the following development, proposed via a concurrent SSDA. Specifically, the proposed works sought under the SSDA include:

- Construction of a 43-storey (+ plant) mixed-use tower, comprising:
 - 245 residential apartments
 - 99 co-living units
 - Ground floor retail premises, to all three street frontages
 - A hotel component within the podium
 - Basement car parking
- Associated landscaping and public domain improvements, including the provision of a pedestrian through-site link that runs east/west adjacent to the Newcastle Interchange.

It is noted that the project will commit to providing 15% of the residential GFA as affordable housing for a minimum of 15 years, to be managed by a registered Community Housing Provider (CHP).

The proposed SSDA will seek consent for the use of basement structures and enabling works approved under DA2018/01197 (as modified).

For a detailed description of the proposed development, refer to the EIS prepared by Beam Planning, and the Architectural Drawings prepared by SJB Architecture.

The purpose of this report is to assess the impact of the development proposed under SSD-89869959 in accordance with the Flooding requirements set out in the SEARs issued by DPHI on 26 September 2025.

This FIRA report addresses the following relevant Secretary's Environmental Assessment Requirements (SEARs), which were issued on 26 September 2025 in relation to the project, as set out in **Table 1**.



8.1 Previous Flood Studies

Previous studies of flooding of the Fairy and Cabbage Tree Creek floodplains include the following:

- 2012 Newcastle City-wide Floodplain Risk Management Study and Plan
- 2017 Williamstown Salt Ash Floodplain Risk Management Study & Plan
- 2024 Lower Hunter Floodplain Cumulative Development Impact Study and Plan - Stage 2
- 2024 Throsby, Styx & Cottage Creek Flood Study

8.2 Flood Risk Assessment

As outlined in **Section 2.2**, a new Flood Information Certificate was obtained from Newcastle City Council on 21 August 2025 (FL2025/00243). A copy of this certificate is appended as **Appendix D**.

The 2025 certificate describes both “Ocean Flooding” and “Local Catchment Flooding”.

Ocean Flooding flood levels, velocities and flood hazard and risk categories are reported to be based on the 2012 Newcastle City-wide Floodplain Risk Management Study (BMT WBM, 2012).

In order to assess the impacts of proposed development under ocean flooding conditions a request was submitted to Newcastle City Council to be provided copies of the 2012 model and results files. On 20 November 2025 Newcastle City Council advised that it was “*unable to provide the 2012 City Wide FRMS&P model and data files*”. Consequently an assessment of the impact of the proposed development under Council’s adopted ocean flooding conditions was unable to be undertaken.

Local catchment flood levels, velocities and flood hazard and risk categories are reported to be based on the 2024 Throsby, Styx and Cottage Creek Flood Study

In order to assess the impacts of proposed development under local catchment flooding conditions a request was also submitted to Newcastle City Council and copies of the 2024 model and results files were provided. Consequently an assessment of the impact of the proposed development under Council’s adopted local catchment flooding conditions has been undertaken.

The floodplain model assembled for the 2024 Throsby, Styx and Cottage Creek Flood Study was adopted for the assessment of Benchmark Conditions.

The estimated flood extents and levels, depths, velocities and hazards in the 5% AEP, 1% AEP, 1% AEP in 2020, 1% AEP in 2100 and PMF events under Benchmark conditions are mapped in the Figures attached in **Appendix A**.

8.3 Flood Impact Assessment

8.3.1 Future Conditions

The assessment of flooding under Future Conditions was undertaken by modifying the TUFLOW model of Benchmark Conditions to represent the planned development as summarised in **Section 4.1** and in selected drawings attached in **Appendix E**

The estimated flood extents and levels, depths, velocities and hazards in the 5% AEP, 1% AEP, 1% AEP in 2020, 1% AEP in 2100 and PMF events under Future Conditions are attached in **Appendix B**.



8.3.2 Flood Impact Assessment

Flood Level Impacts

The estimated impacts of the proposed development on the 5% AEP, 1% AEP, 1% AEP in 2050, 1% AEP in 2100 flood levels and the PMF levels (in comparison to Benchmark Conditions) are plotted respectively in **Figures I1, I4, I7, I10 and I13** in **Appendix C**.

It is concluded that:

- In the 5% AEP, 1% AEP, 1% AEP in 2050, 1% AEP in 2100 the flood level impacts are negligible;
- In the PMF there is a small area on the southern boundary where the PMF level increases by around 0.05 m;
- Overall the proposed development has a negligible adverse impact on flood levels.

Flood Velocity Impacts

The estimated impacts of the proposed development on the 5% AEP, 1% AEP, 1% AEP in 2050, 1% AEP in 2100 flood velocities and the PMF velocities (in comparison to Benchmark Conditions) are plotted respectively in **Figures I2, I5, I8, I11 and I14** in **Appendix C**.

It is concluded that:

- In the 5% AEP, 1% AEP, 1% AEP in 2050, 1% AEP in 2100 there are some scattered small impacts on flood velocities which are considered to have a negligible impact;
- In the PMF there is a small area south of the southwest corner of the subject property where the PMF velocities increases but remain below 1.5 m/s and therefore are not a scour concern;
- Overall the proposed development has a negligible adverse impact on flood velocities.

Flood Hazard Impacts

The estimated impacts of the proposed development on the 5% AEP, 1% AEP, 1% AEP in 2050, 1% AEP in 2100 flood hazards and the PMF hazards (in comparison to flood hazards under Benchmark Conditions) are plotted respectively in **Figures I3, I6, I9, I12 and I15** in **Appendix C**.

It is concluded that:

- In the 5% AEP, 1% AEP, 1% AEP in 2050, 1% AEP in 2100 there are some scattered small changes in the flood hazard which are considered to have a negligible impact;
- In the PMF there is scattered impacts on flood hazard where the local extent of a flood hazard category has changed by one grid cell which does not significantly change the hazards experience on the floodplain in the vicinity of the subject property;
- Overall the proposed development has a negligible adverse impact on flood hazards.

It was concluded that the proposed development without any flood storage has a negligible adverse impact on flood levels, velocities and hazards.



8.4 Emergency Planning

The hierarchy of plans which guide the planning for floods in NSW are overviewed and include:

- 2023 NSW State Emergency Management Plan
- 2024 NSW State Flood Plan
- 2021 Hunter-Central Coast Regional Emergency Management Plan
- 2022 City of Newcastle Flood Emergency Sub Plan

Council's website includes a range resources to prepare for emergencies and natural hazards which are overviewed in **Section 5.5**.

8.5 Flood Emergency Response

8.5.1 Flood Risks

Flood Levels, Velocities and Hazard Categories

The estimated flood extents and levels, flood depths, flood velocities and flood hazards under Future Conditions are described in **Section 4.1** and are mapped in the Figures attached in **Appendix B**.

Rate of Rise of Floodwaters

While the driveway crest level is set at the 1% AEP flood level + 500 mm freeboard and is compliant, this freeboard would be overwhelmed in a PMF event. The 4 hour PMF is estimated to reach a level of 3.3 m AHD ie. 0.5 m higher than the driveway crest level.

Based on the representative spill level of 2.80 m AHD to initiate flow down the driveway (assuming that the ingress of floodwaters via any other vents or lift shafts is limited) it is estimated that in a 4 hour PMF event that the onset of flows down the car park ramps would occur around 2 hours 15 minutes after start of the PMP storm.

The rates of filling of each level of the basement car parking was estimated using a simple hydraulic model of flows down the access ramps. For the case of the 4 hour PMF, the estimated times it would take to fill each level of the car park to a depth of 0.9 m and to a depth of 2.5 m is summarised in **Table 4**.

In events less extreme than the PMF but of sufficient severity to overtop the driveway crest level and where the inflow volume is less than the storage volume in the car parking levels then the same flooding behaviour would be expected with flooding initially occurring on all three levels but at the time inflows cease floodwaters would then continue to flow down the access ramps until the flood level in the car park reaches its maximum level (ie. the basement levels would fill progressively from Basement 03 like a bath tub).

Pedestrian and Vehicular Safety

The latest edition of Australian Rainfall and Runoff released in 2019 provides guidance on both pedestrian and vehicle stability in floods as does the 2023 Flood Risk Management Guideline FB03 released on 30 June 2023 by NSW DPE.



The 2023 Flood Risk Management Guideline FB03 released on 30 June 2023 by NSW DPE includes a plot of thresholds for the stability of people in floods (see **Figure 12**) and a plot of thresholds for vehicle stability in floods (see **Figure 13**).

Under overland flow flood conditions in the 1% AEP in 2050, PMF 4 hour and PMF 6 hour events the following results are plotted at reference locations H2, H3, H4, H5, H6 and H7 and attached in **Appendix F**:

- (i) The variation in flood depths;
- (ii) The variation in flood hazard in comparison to flood hazard categories (refer to **Figure 8**);
- (iii) The variation in flood hazard in comparison to pedestrian stability limits.

Indicative Onset and Duration of Unsafe Conditions

The indicative durations of unsafe conditions for small vehicles, large vehicles, children and adults are summarised in **Table 5** while the elapsed time to reach unsafe conditions are summarised in **Table 6**.

It is noted that the Hannell Street frontage of the property (Locations H4 and H5) and Hannell Street either do not experience unsafe conditions or if unsafe conditions are experienced they are for a shorter period of time compared to conditions at Locations H3, H2 or H7. Consequently any emergency access to the development during major and extreme floods should be via Hannell Street.

8.5.2 Flood Warning

Council provides a Flood Alert Service which requires any interested person or organisation to sign up to be notified in case of an emergency. Visit: [Flooding - City of Newcastle](#)

Other sources of information regarding approaching severe weather conditions which could cause potential flooding at the site including:

- The Bureau of Meteorology through their website (www.bom.gov.au);
- The Hazards Near Me app ([Hazards Near Me app | NSW Government](#))
- Observation of local rainfall;
- The NSW SES ([Homepage | NSW SES](#));
- City of Newcastle Disaster Dashboard ([Disaster Dashboard](#));
- Local television stations; and/or
- Local radio stations.

An important indication of likely imminent flood activity would be intense local rainfall and residents; retail workers and visitors should take notice of extreme rainfall warnings issued by the Bureau of Meteorology and disseminated by local media.

Council provides a list of emergency contacts at: [Emergency Contacts - City of Newcastle](#).



8.5.3 Flood Refuge and Evacuation

The designated flood refuge is the hotel amenity facilities on Level 06. There is 1,019 m² of GFA on this level. UPG have estimated that up to 55 persons may be present in retail spaces on the ground floor. This would require an available refuge area of 55 x 2 m² per person = 110 m². It is concluded that the hotel amenity facilities offer an ample area for flood refuge.

Vertical evacuation (shelter-in-place) is proposed for this building. All hotel staff, hotel guests, other workers, residents and visitors located on Level 1 or higher should remain in place unless directed to evacuate by NSW SES.

In the event that lifts cease to operate (for safety reasons or due to loss of power during a major storm) the central stairs provide an evacuation route from the basement levels up to Level 06.

All retail areas on the ground floor and the Residential Lobby have back-of house access to the central stairs. Any persons evacuating from the Co-living Lobby or the Hotel Lobby can access the central stairs by first walking up to the Mezzanine Level.

8.5.4 Flood Emergency Response Plan (FERP)

In 2022 Epicentre Consulting Engineers prepared a Flood Emergency Response Plan (FERP) for the mixed-use development at 10 Dangar Street, Wickham (Lot 1 DP1197377) (see **Appendix G**).

If required an updated Flood Emergency Response Plan could be prepared prior to issue of a CC.

8.6 Compliance Assessment

This FIRA addresses the flooding considerations identified in Section 5.21 Flood Planning of the Newcastle LEP 2009 as set out in **Table 7**.

This FIRA also addresses the flooding considerations identified in Section 5.22 Special Flood Considerations of the Newcastle LEP 2012 as set out in **Table 8**.

The assessment of compliance with the Newcastle DCP 2023, which has been based on proposed flood mitigation measures incorporated into the development and the resulting flood impacts which are described in **Section 4.2**, is set out in **Table 9**.

It is concluded that the proposed development complies with the flooding requirements of the Newcastle LEP 2012 and the intent of the Newcastle DCP 2023.



9 References

- BMT WBM (2012) "Newcastle City-wide Floodplain Risk Management Study and Plan", *Final Report*, Ver 3, prepared for Newcastle City Council, June, 219 pp + Apps
- BMT WBM (2017) "Williamstown Salt Ash Floodplain Risk Management Study & Plan", *Final Report*, Revision 4, prepared for Port Stephens Council, September, pp 123 + Apps
- Department of Planning and Environment (2023). "*Flood Risk Management Guideline FB01: Understanding and Managing Flood Risk*", NSW Government, June, 56 pp.
- KBR (2024) "Lower Hunter Floodplain Cumulative Development Impact Study and Plan – Stage 2", *Final Report*, prepared for GLN Planning, 3 September, 28 pp + Apps.
- NSW Government (2021) *Hunter-Central Coast Regional Emergency Management Plan*
- NSW Government (2023) *Flood Risk Management Guideline FB03 Flood Hazard*.
- NSW Government (2023) *NSW State Emergency Management Plan*
- NSW Government (2024) *NSW State Flood Plan, A Sub Plan of the State Emergency Management Plan (EMPLAN)*
- NSW SES and City of Newcastle (2022) *City of Newcastle Flood Emergency Sub Plan*
- Rhelm (2024) "Throsby, Styx & Cottage Creek Flood Study", *Final Report*, Ver 4, prepared for Newcastle City Council, June, 70 pp + App

Appendix A Benchmark Conditions





5% AEP Flood Extents and Flood Levels
Benchmark Conditions

Project: Flood Impact Risk Assessment
10 Dangar Street, Wickham

Client: Urban Property Group
Project Code: 300204409
Drawn By: JL, Checked By: SY
Date: (2026-03-23)

Figure No: **Figure E1**

Legend

- Study Area
- 0.1m Water Level Contours (mAHD)
- Flood Extent
- Cadastral

DRAFT - Not For Construction

Notes:
1. Map displayed in EPSG:28356

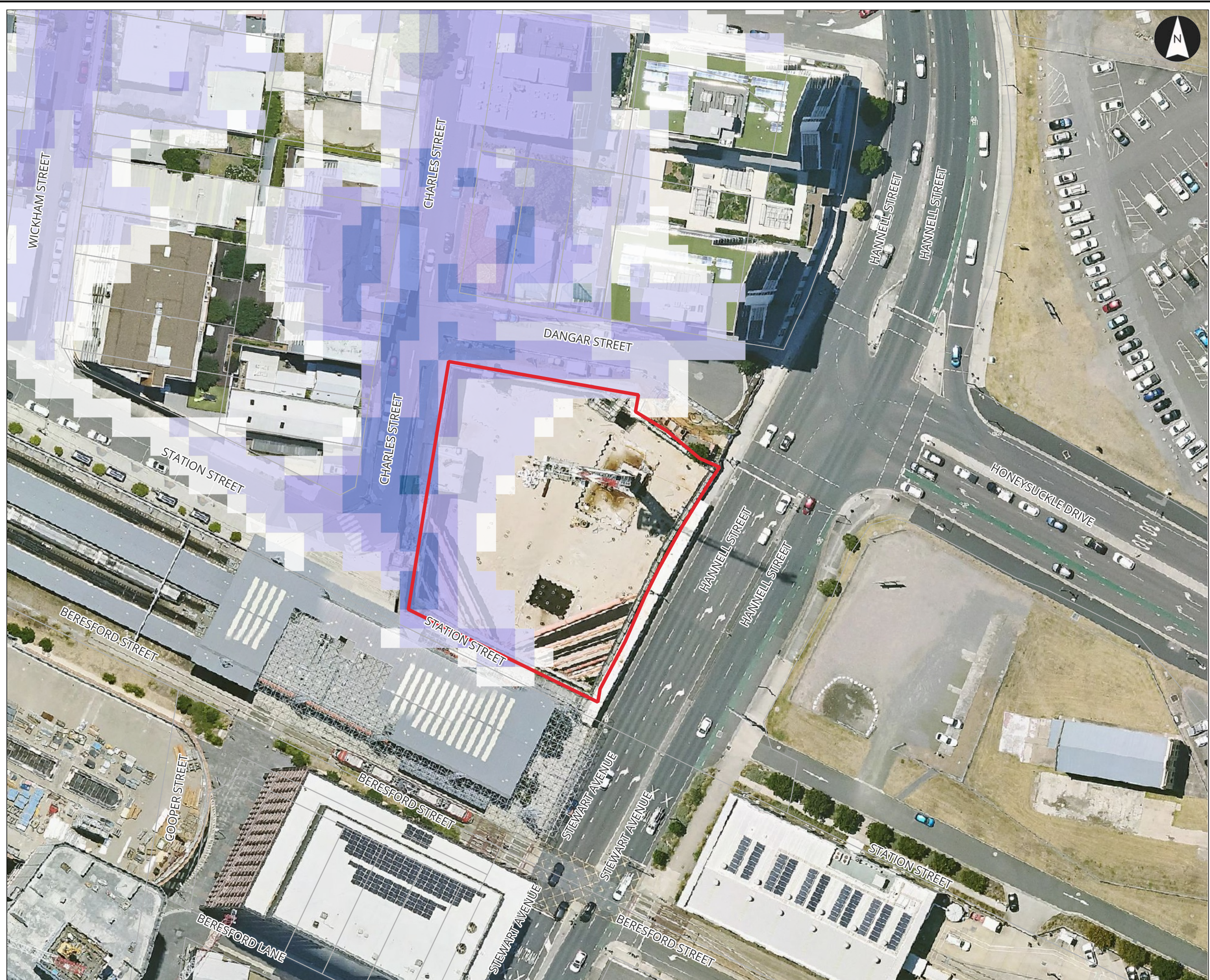
References:
1. Australia Latest Metromap
2. NSW Cadasre
2. NSW Road

Stantec

7 0 7 14 21 28 m

Scale at A3: 1:750





5% AEP Flood Depths Benchmark Conditions

Project: Flood Impact Risk Assessment
10 Dangar Street, Wickham

Client: Urban Property Group

Project Code: 300204409

Drawn By: JL, Checked By: SY

Date: (2026-03-23)

Figure No: **Figure E2**

Legend

 Study Area

Flood Depth (m)

 0.00 to 0.10

 0.10 to 0.30

 0.30 to 0.50

 0.50 to 0.70

 0.70 to 1.00

 1.00 to 1.50

 > 1.50

 Cadastre

DRAFT - Not For Construction

Notes:

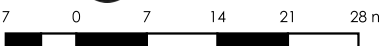
1. Map displayed in EPSG:28356

References:

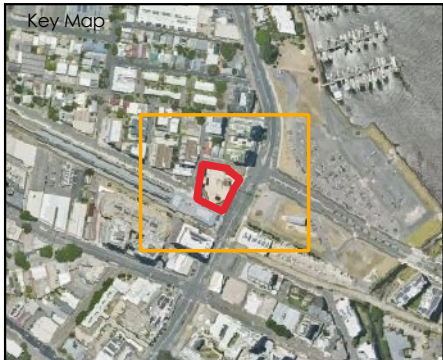
1. Australia Latest Metromap

2. NSW Cadastre

2. NSW Road



Scale at A3: 1:750





5% AEP Flood Velocities Benchmark Conditions

Project: Flood Impact Risk Assessment
10 Dangar Street, Wickham

Client: Urban Property Group
Project Code: 300204409
Drawn By: JL, Checked By: SY
Date: (2026-03-23)

Figure No: **Figure E3**

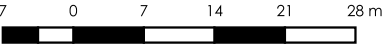
Legend

-  Study Area
- Flood Velocity (m/s)
 -  0.00 to 0.50
 -  0.50 to 1.00
 -  1.00 to 1.50
 -  1.50 to 2.00
 -  2.00 to 3.00
 -  > 3.00
 -  Cadastre

DRAFT - Not For Construction

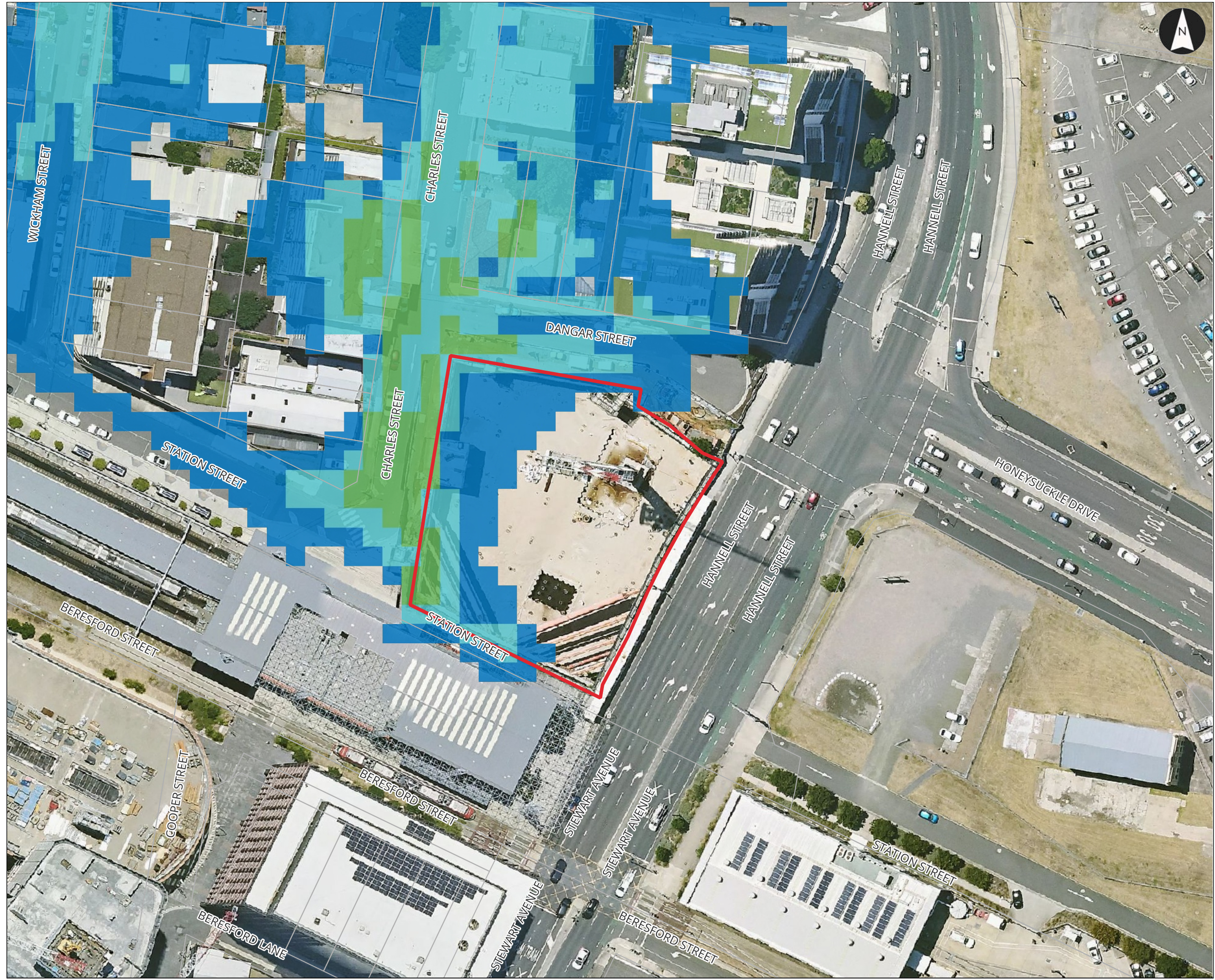
Notes:
1. Map displayed in EPSG:28356

References:
1. Australia Latest Metromap
2. NSW Cadasre
2. NSW Road



Scale at A3: 1:750





**5% AEP Flood Hazards
Benchmark Conditions**

Project: Flood Impact Risk Assessment
10 Dangar Street, Wickham

Client: Urban Property Group
Project Code: 300204409
Drawn By: JL, Checked By: SY
Date: (2026-03-23)

Figure No: **Figure E4**

Legend

Study Area

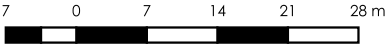
Flood Hazards (H1-H6)

- H1 - Generally safe for vehicles, people and buildings.
- H2 - Unsafe for small vehicles.
- H3 - Unsafe for vehicles, children and the elderly.
- H4 - Unsafe for vehicles and people
- H5 - Unsafe for vehicles and people
All buildings vulnerable to structural damage. Some less robust buildings subject to failure.
- H6 - Unsafe for vehicles and people
All building types considered vulnerable to failure.
- Cadastre

DRAFT - Not For Construction

Notes:
1. Map displayed in EPSG:28356

References:
1. Australia Latest Metromap
2. NSW Cadasre
2. NSW Road



Scale at A3: 1:750





1% AEP Flood Extents and Flood Levels Benchmark Conditions

Project: Flood Impact Risk Assessment
10 Dangar Street, Wickham

Client: Urban Property Group

Project Code: 300204409

Drawn By: JL, Checked By: SY

Date: (2026-03-23)

Figure No: **Figure E5**

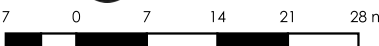
Legend

- Study Area
- 0.1m Water Level Contours (mAHD)
- Flood Extent
- Cadastre

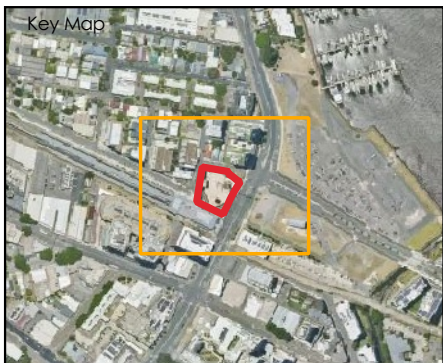
DRAFT - Not For Construction

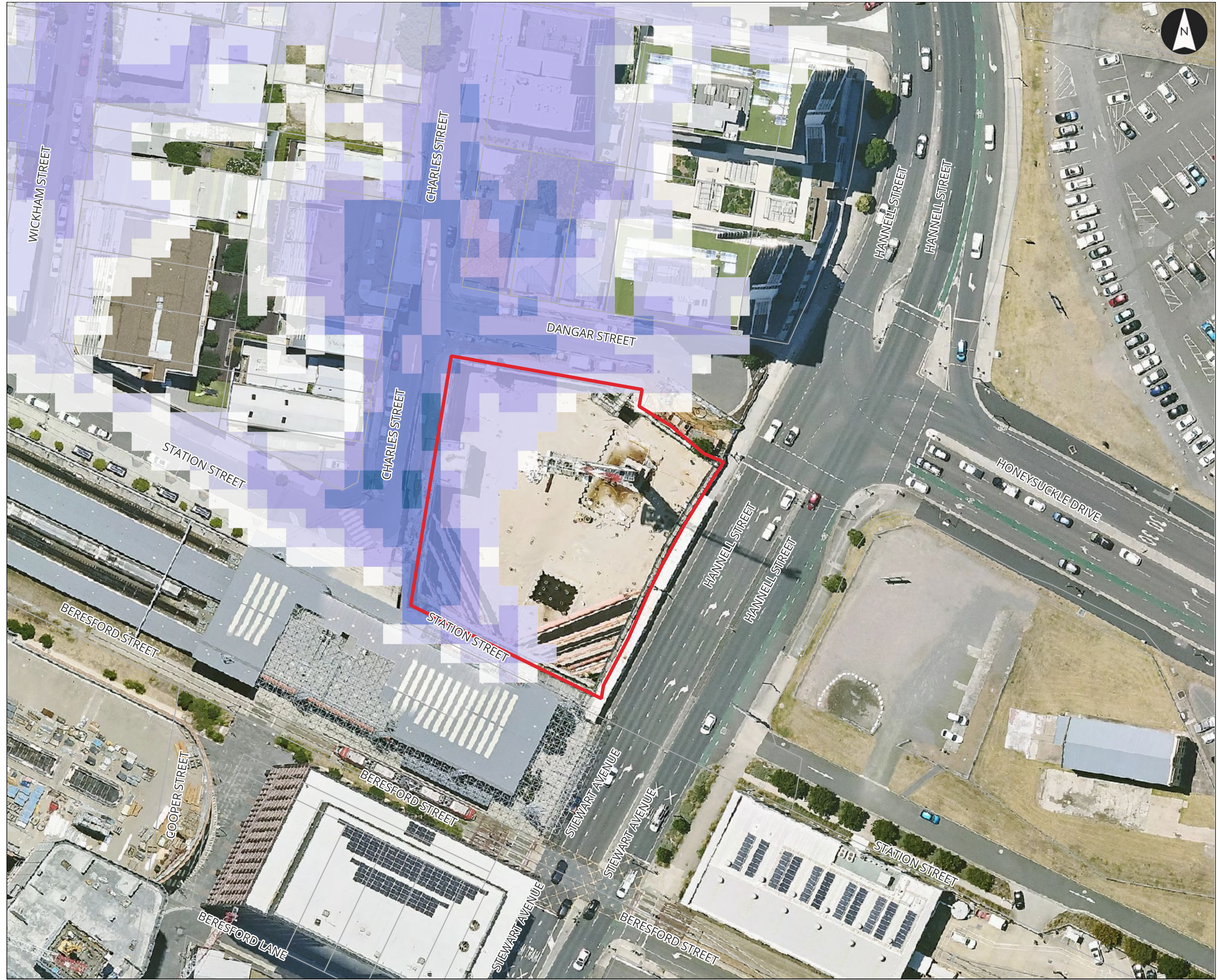
Notes:
1. Map displayed in EPSG:28356

References:
1. Australia Latest Metromap
2. NSW Cadasre
2. NSW Road



Scale at A3: 1:750





**1% AEP Flood Depths
Benchmark Conditions**

Project: Flood Impact Risk Assessment
10 Dangar Street, Wickham

Client: Urban Property Group
Project Code: 300204409
Drawn By: JL, Checked By: SY
Date: (2026-03-23)

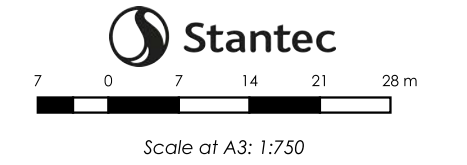
Figure No: **Figure E6**

- Legend**
- Study Area
 - Flood Depth (m)
 - 0.00 to 0.10
 - 0.10 to 0.30
 - 0.30 to 0.50
 - 0.50 to 0.70
 - 0.70 to 1.00
 - 1.00 to 1.50
 - > 1.50
 - Cadastre

DRAFT - Not For Construction

Notes:
1. Map displayed in EPSG:28356

References:
1. Australia Latest Metromap
2. NSW Cadasre
2. NSW Road





**1% AEP Flood Velocities
Benchmark Conditions**

Project: Flood Impact Risk Assessment
10 Dangar Street, Wickham

Client: Urban Property Group
Project Code: 300204409
Drawn By: JL, Checked By: SY
Date: (2026-03-23)

Figure No: **Figure E7**

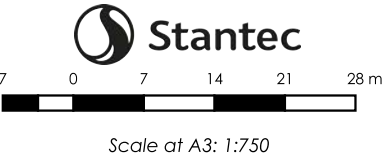
Legend

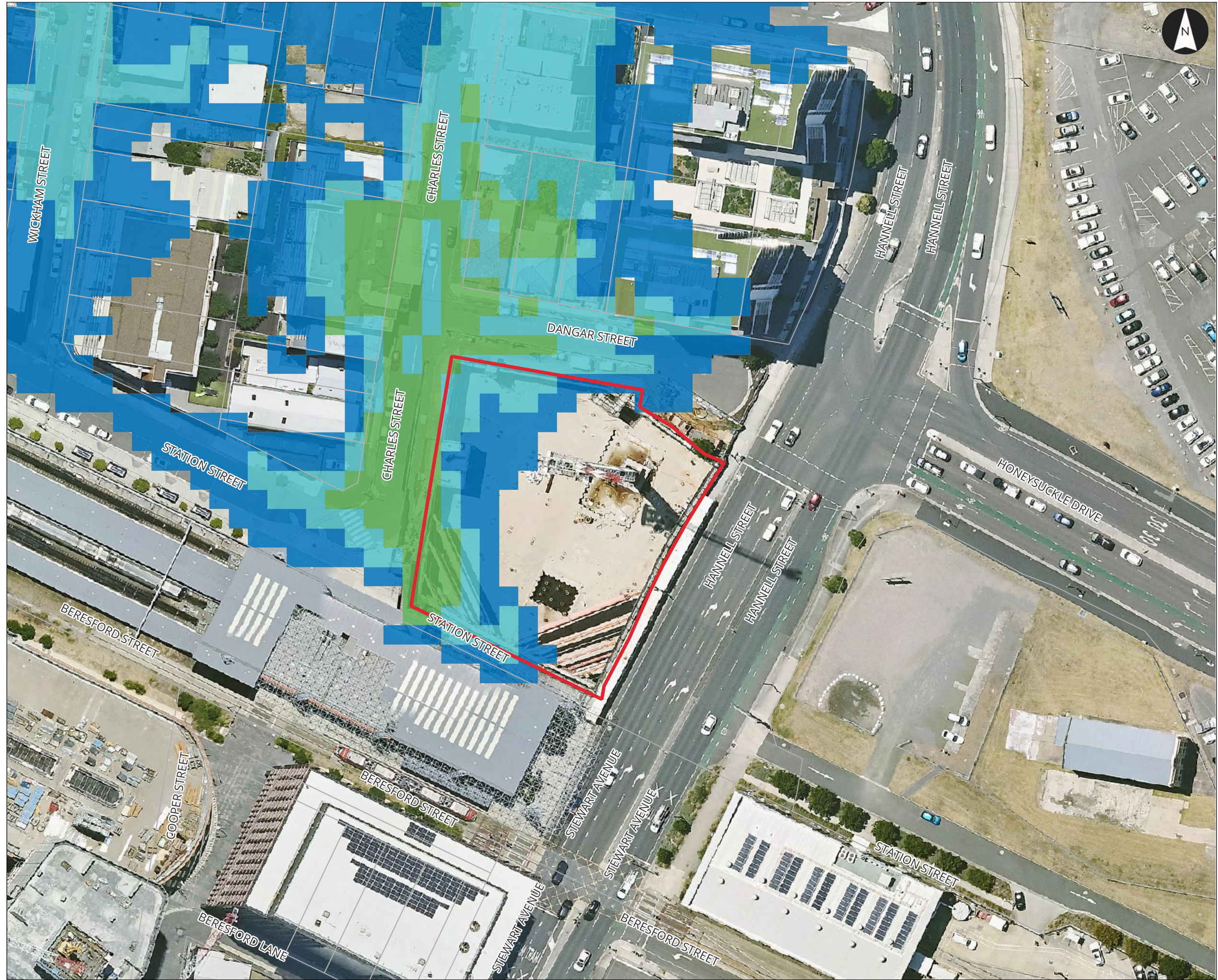
-  Study Area
- Flood Velocity (m/s)
-  0.00 to 0.50
 -  0.50 to 1.00
 -  1.00 to 1.50
 -  1.50 to 2.00
 -  2.00 to 3.00
 -  > 3.00
 -  Cadastre

DRAFT - Not For Construction

Notes:
1. Map displayed in EPSG:28356

References:
1. Australia Latest Metromap
2. NSW Cadastre
2. NSW Road





**1%AEP Flood Hazards
Benchmark Conditions**

Project: Flood Impact Risk Assessment
10 Dangar Street, Wickham

Client: Urban Property Group
Project Code: 300204409
Drawn By: JL, Checked By: SY
Date: (2026-03-23)

Figure No: **Figure E8**

Legend

Study Area

Flood Hazards (H1-H6)

- H1 - Generally safe for vehicles, people and buildings.
- H2 - Unsafe for small vehicles.
- H3 - Unsafe for vehicles, children and the elderly.
- H4 - Unsafe for vehicles and people
- H5 - Unsafe for vehicles and people
All buildings vulnerable to structural damage. Some less robust buildings subject to failure.
- H6 - Unsafe for vehicles and people
All building types considered vulnerable to failure.
- Cadastre

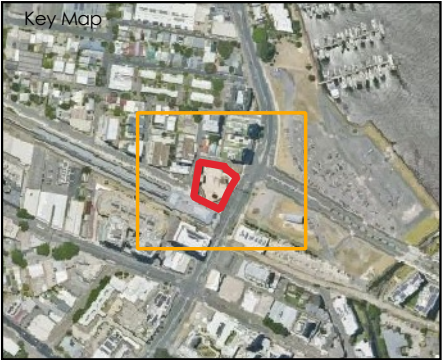
DRAFT - Not For Construction

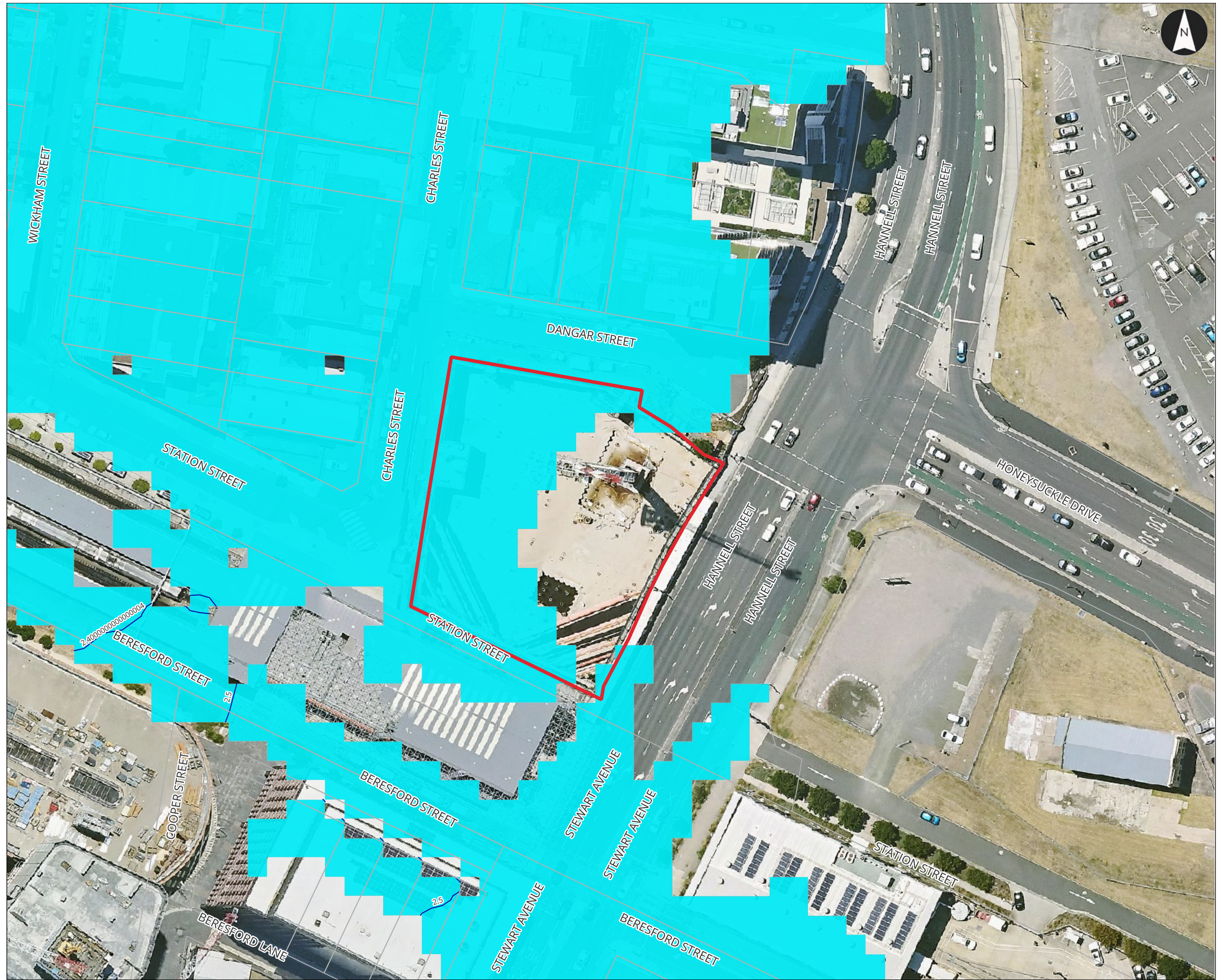
Notes:
1. Map displayed in EPSG:28356

References:
1. Australia Latest Metromap
2. NSW Cadasre
2. NSW Road



Scale at A3: 1:750





1% AEP in 2050 Flood Extents and Flood Levels
Benchmark Conditions

Project: Flood Impact Risk Assessment
10 Dangar Street, Wickham

Client: Urban Property Group
Project Code: 300204409
Drawn By: JL, Checked By: SY
Date: (2026-03-23)

Figure No: **Figure E9**

Legend

- Study Area
- 0.1m Water Level Contours (mAHD)
- Flood Extent
- Cadastre

DRAFT - Not For Construction

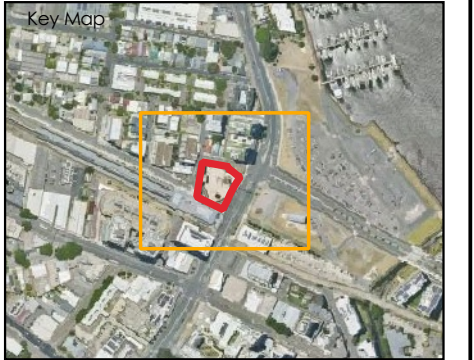
Notes:
1. Map displayed in EPSG:28356

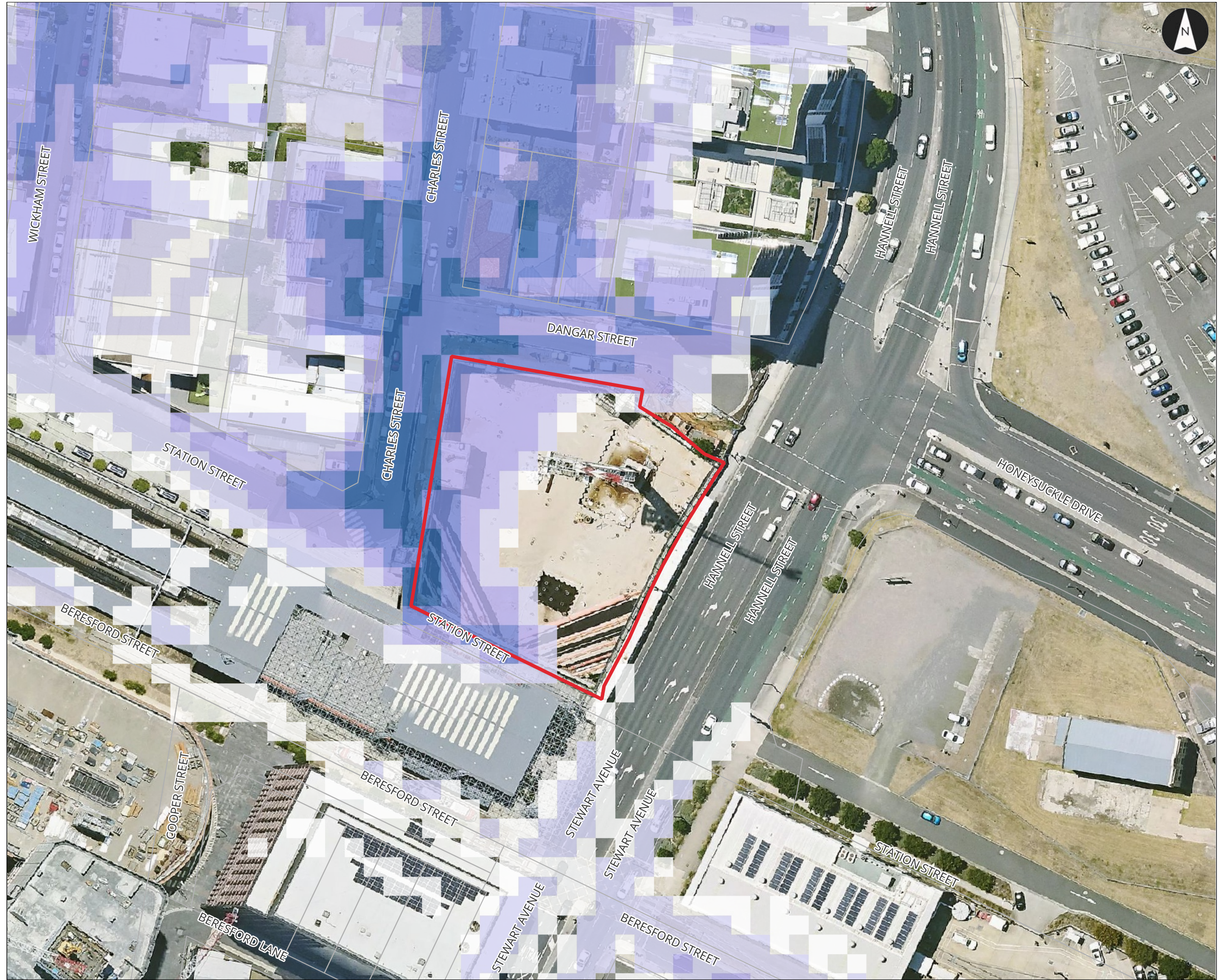
References:
1. Australia Latest Metromap
2. NSW Cadastre
2. NSW Road

Stantec

7 0 7 14 21 28 m

Scale at A3: 1:750





**1% AEP in 2050 Flood Depths
Benchmark Conditions**

Project: Flood Impact Risk Assessment
10 Dangar Street, Wickham

Client: Urban Property Group
Project Code: 300204409
Drawn By: JL, Checked By: SY
Date: (2026-03-23)

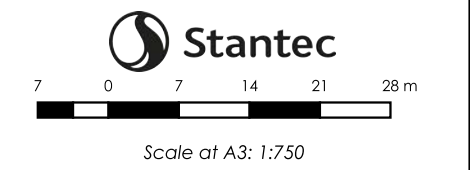
Figure No: **Figure E10**

- Legend**
-  Study Area
- Flood Depth (m)
-  0.00 to 0.10
 -  0.10 to 0.30
 -  0.30 to 0.50
 -  0.50 to 0.70
 -  0.70 to 1.00
 -  1.00 to 1.50
 -  > 1.50
 -  Cadastre

DRAFT - Not For Construction

Notes:
1. Map displayed in EPSG:28356

References:
1. Australia Latest Metromap
2. NSW Cadasre
2. NSW Road





1%AEP in 2050 Flood Velocities Benchmark Conditions

Project: Flood Impact Risk Assessment
10 Dangar Street, Wickham

Client: Urban Property Group
Project Code: 300204409
Drawn By: JL, Checked By: SY
Date: (2026-03-23)

Figure No: **Figure E11**

Legend

 Study Area

Flood Velocity (m/s)

	0.00 to 0.50
	0.50 to 1.00
	1.00 to 1.50
	1.50 to 2.00
	2.00 to 3.00
	> 3.00
	Cadastre

DRAFT - Not For Construction

Notes:
1. Map displayed in EPSG:28356

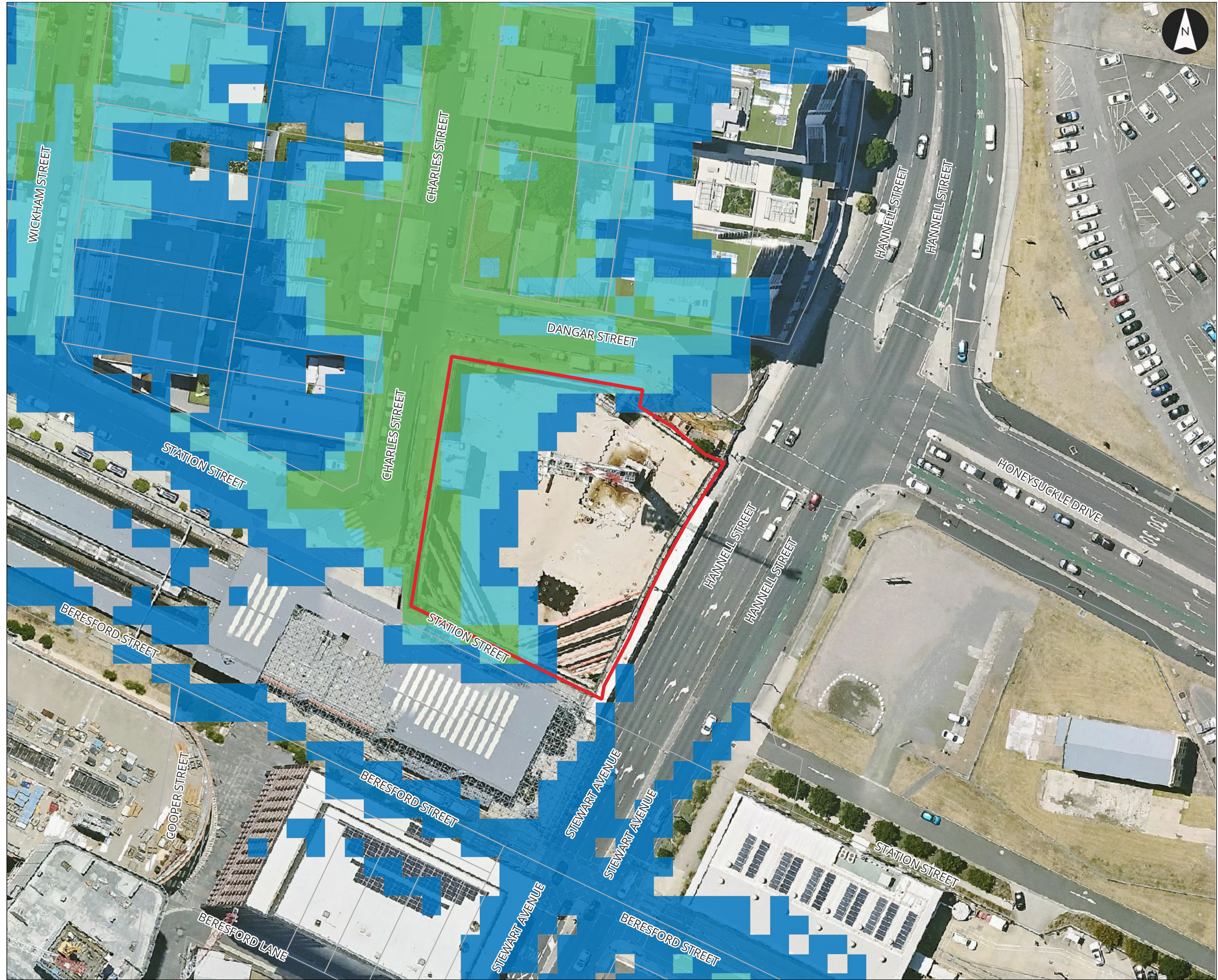
References:
1. Australia Latest Metromap
2. NSW Cadasre
2. NSW Road

 **Stantec**

7 0 7 14 21 28 m

Scale at A3: 1:750





1% AEP in 2050 Flood Hazards Benchmark Conditions

Project: Flood Impact Risk Assessment
10 Dangar Street, Wickham

Client: Urban Property Group
Project Code: 300204409
Drawn By: JL, Checked By: SY
Date: (2026-03-23)

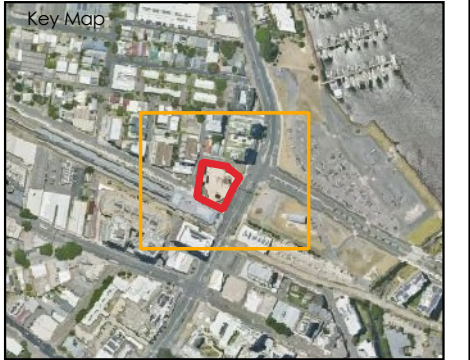
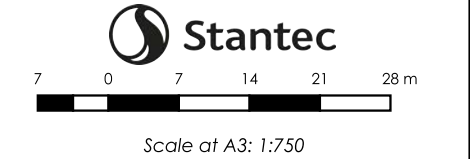
Figure No: **Figure E12**

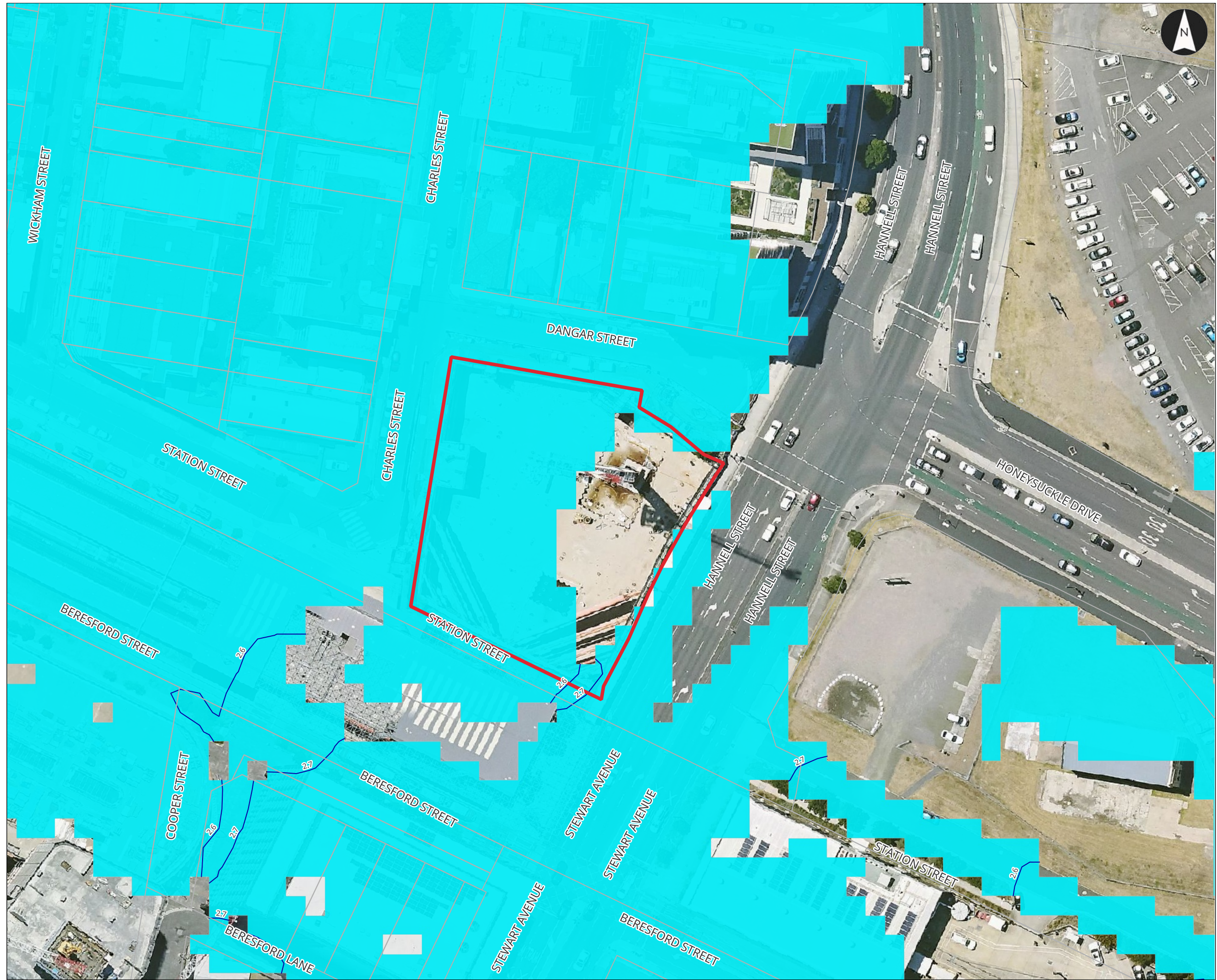
- Legend**
- Study Area
 - Flood Hazards (H1-H6)
 - H1 - Generally safe for vehicles, people and buildings.
 - H2 - Unsafe for small vehicles.
 - H3 - Unsafe for vehicles, children and the elderly.
 - H4 - Unsafe for vehicles and people
 - H5 - Unsafe for vehicles and people
All buildings vulnerable to structural damage. Some less robust buildings subject to failure.
 - H6 - Unsafe for vehicles and people
All building types considered vulnerable to failure.
 - Cadastre

DRAFT - Not For Construction

Notes:
1. Map displayed in EPSG:28356

References:
1. Australia Latest Metromap
2. NSW Cadasre
2. NSW Road





1%AEP in 2100 Flood Extents and Flood Levels Benchmark Conditions

Project: Flood Impact Risk Assessment
10 Dangar Street, Wickham

Client: Urban Property Group

Project Code: 300204409

Drawn By: JL, Checked By: SY

Date: (2026-03-23)

Figure No: **Figure E13**

Legend

- Study Area
- 0.1m Water Level Contours (mAHd)
- Flood Extent
- Cadastre

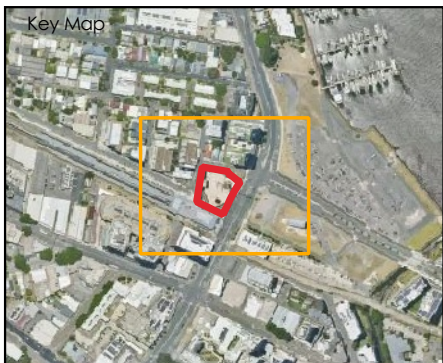
DRAFT - Not For Construction

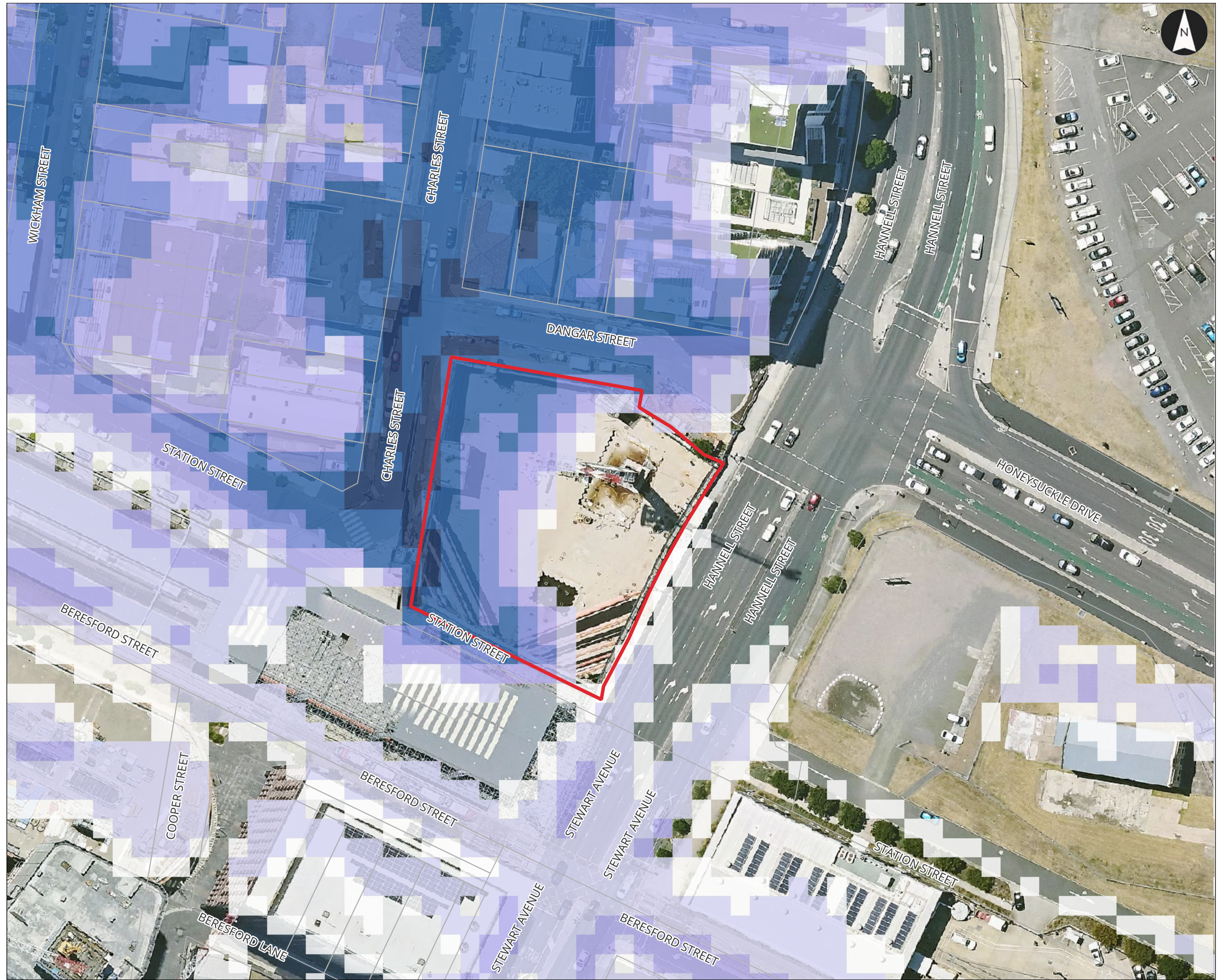
Notes:
1. Map displayed in EPSG:28356

References:
1. Australia Latest Metromap
2. NSW Cadasre
2. NSW Road



Scale at A3: 1:750





**1% AEP in 2100 Flood Depths
Benchmark Conditions**

Project: Flood Impact Risk Assessment
10 Dangar Street, Wickham

Client: Urban Property Group
Project Code: 300204409
Drawn By: JL, Checked By: SY
Date: (2026-03-23)

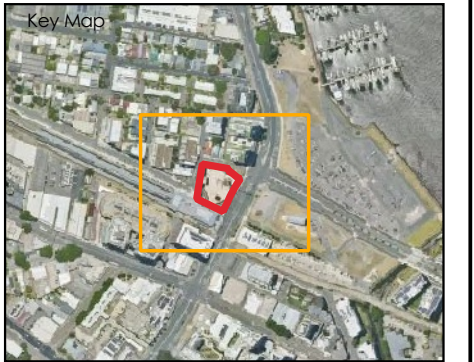
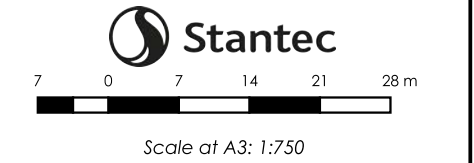
Figure No: **Figure E14**

- Legend**
-  Study Area
- Flood Depth (m)
-  0.00 to 0.10
 -  0.10 to 0.30
 -  0.30 to 0.50
 -  0.50 to 0.70
 -  0.70 to 1.00
 -  1.00 to 1.50
 -  > 1.50
 -  Cadastre

DRAFT - Not For Construction

Notes:
1. Map displayed in EPSG:28356

References:
1. Australia Latest Metromap
2. NSW Cadasre
2. NSW Road





**1%AEP in 2100 Flood Velocities
Benchmark Conditions**

Project: Flood Impact Risk Assessment
10 Dangar Street, Wickham

Client: Urban Property Group
Project Code: 300204409
Drawn By: JL, Checked By: SY
Date: (2026-03-23)

Figure No: **Figure E15**

Legend

-  Study Area
- Flood Velocity (m/s)
 -  0.00 to 0.50
 -  0.50 to 1.00
 -  1.00 to 1.50
 -  1.50 to 2.00
 -  2.00 to 3.00
 -  > 3.00
 -  Cadastre

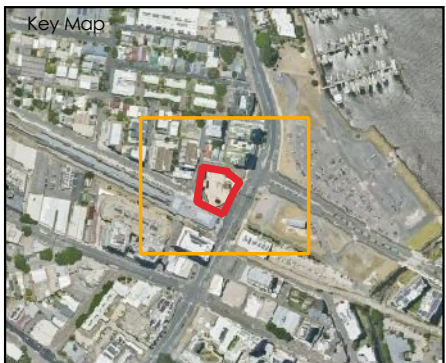
DRAFT - Not For Construction

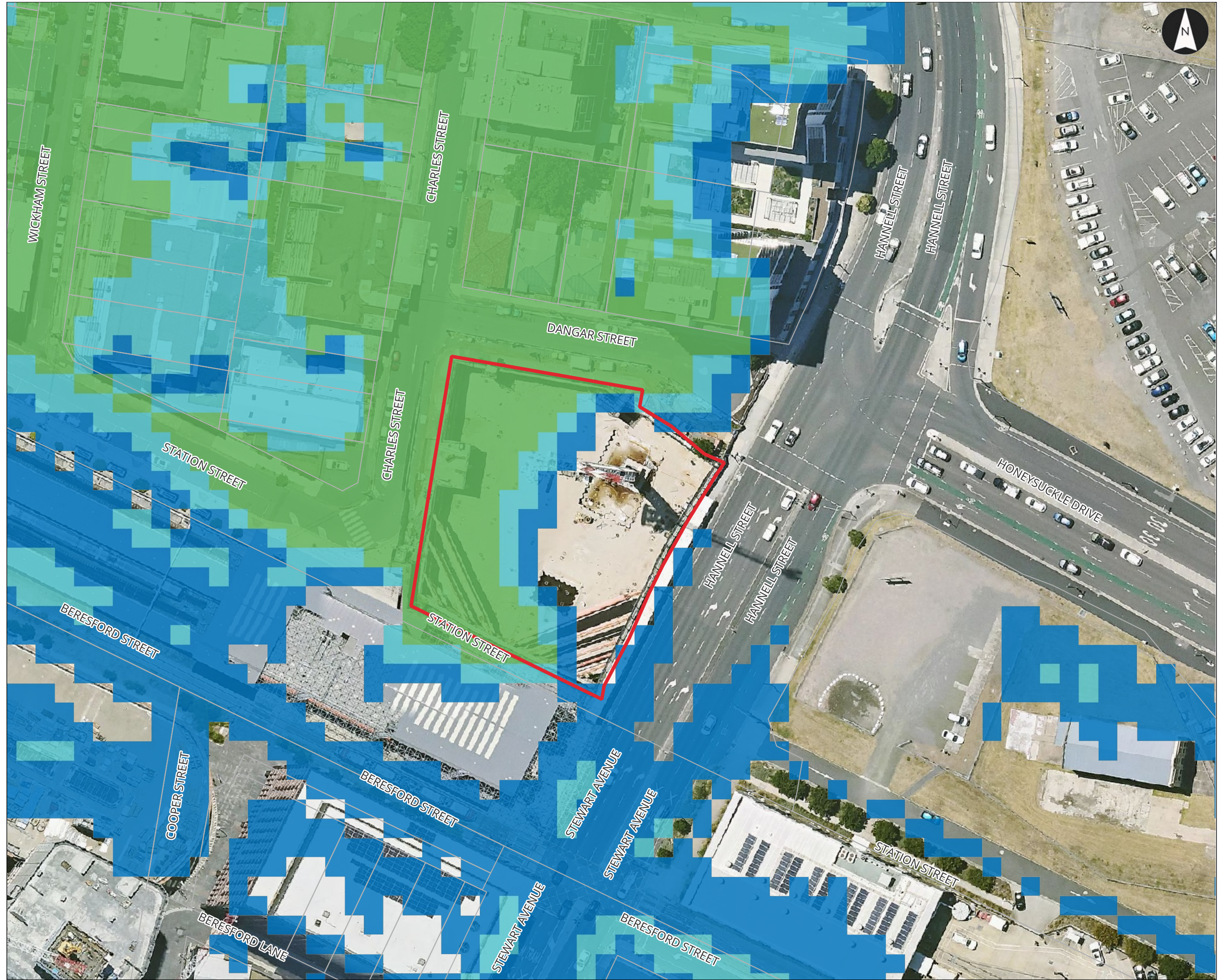
Notes:
1. Map displayed in EPSG:28356

References:
1. Australia Latest Metromap
2. NSW Cadasre
2. NSW Road



Scale at A3: 1:750





1%AEP in 2100 Flood Hazards Benchmark Conditions

Project: Flood Impact Risk Assessment
10 Dangar Street, Wickham

Client: Urban Property Group

Project Code: 300204409

Drawn By: JL, Checked By: SY

Date: (2026-03-23)

Figure No: **Figure E16**

Legend

Study Area

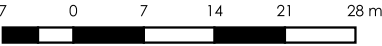
Flood Hazards (H1-H6)

- H1 - Generally safe for vehicles, people and buildings.
- H2 - Unsafe for small vehicles.
- H3 - Unsafe for vehicles, children and the elderly.
- H4 - Unsafe for vehicles and people
- H5 - Unsafe for vehicles and people
All buildings vulnerable to structural damage. Some less robust buildings subject to failure.
- H6 - Unsafe for vehicles and people
All building types considered vulnerable to failure.
- Cadastre

DRAFT - Not For Construction

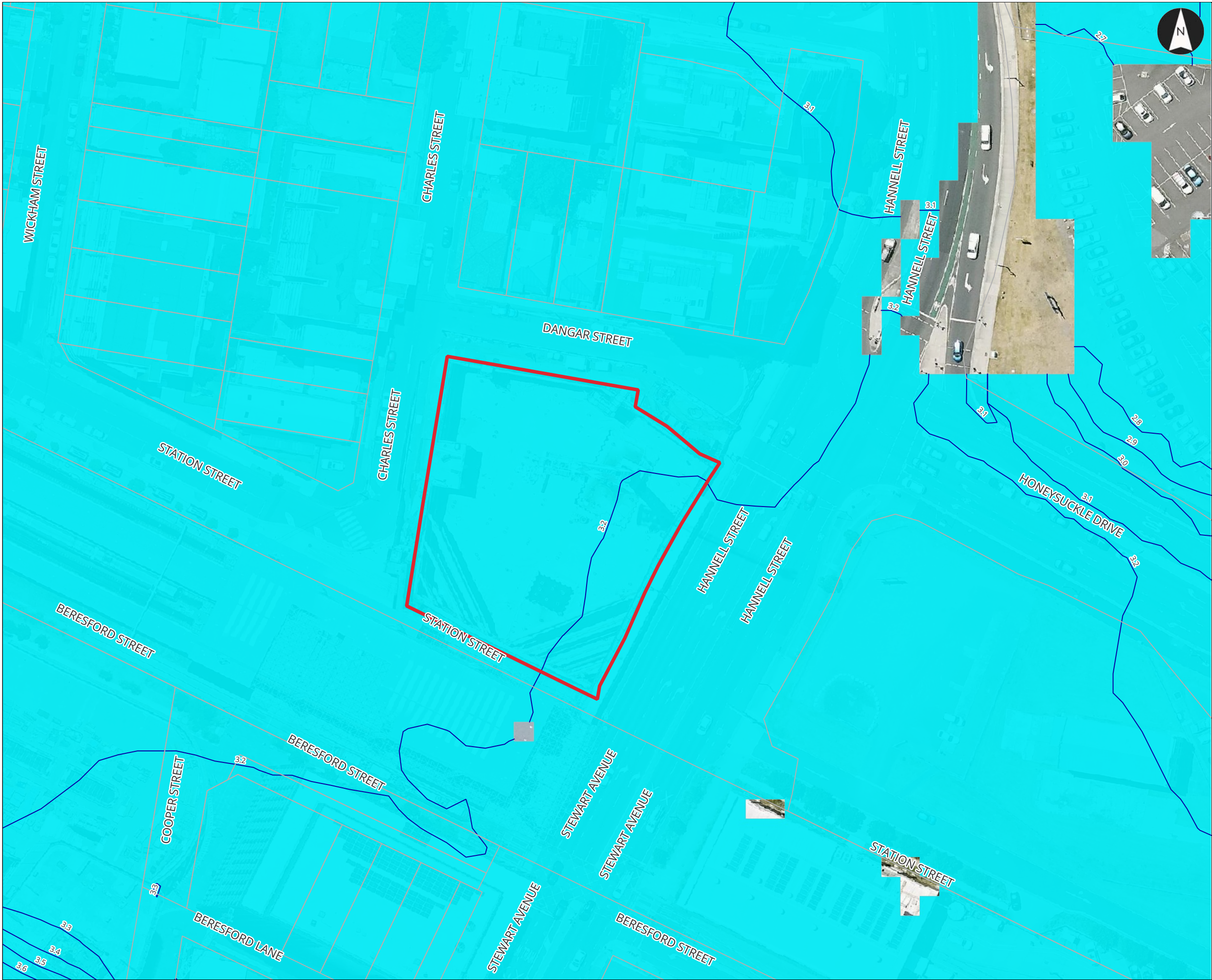
Notes:
1. Map displayed in EPSG:28356

References:
1. Australia Latest Metromap
2. NSW Cadastre
2. NSW Road



Scale at A3: 1:750





**PMF Flood Extents and Flood Levels
Benchmark Conditions**

Project: Flood Impact Risk Assessment
10 Dangar Street, Wickham

Client: Urban Property Group

Project Code: 300204409

Drawn By: JL, Checked By: SY

Date: (2026-03-24)

Figure No: **Figure E17**

Legend

- Study Area
- 0.1m Water Level Contours (mAHd)
- Flood Extent
- Cadastre

DRAFT - Not For Construction

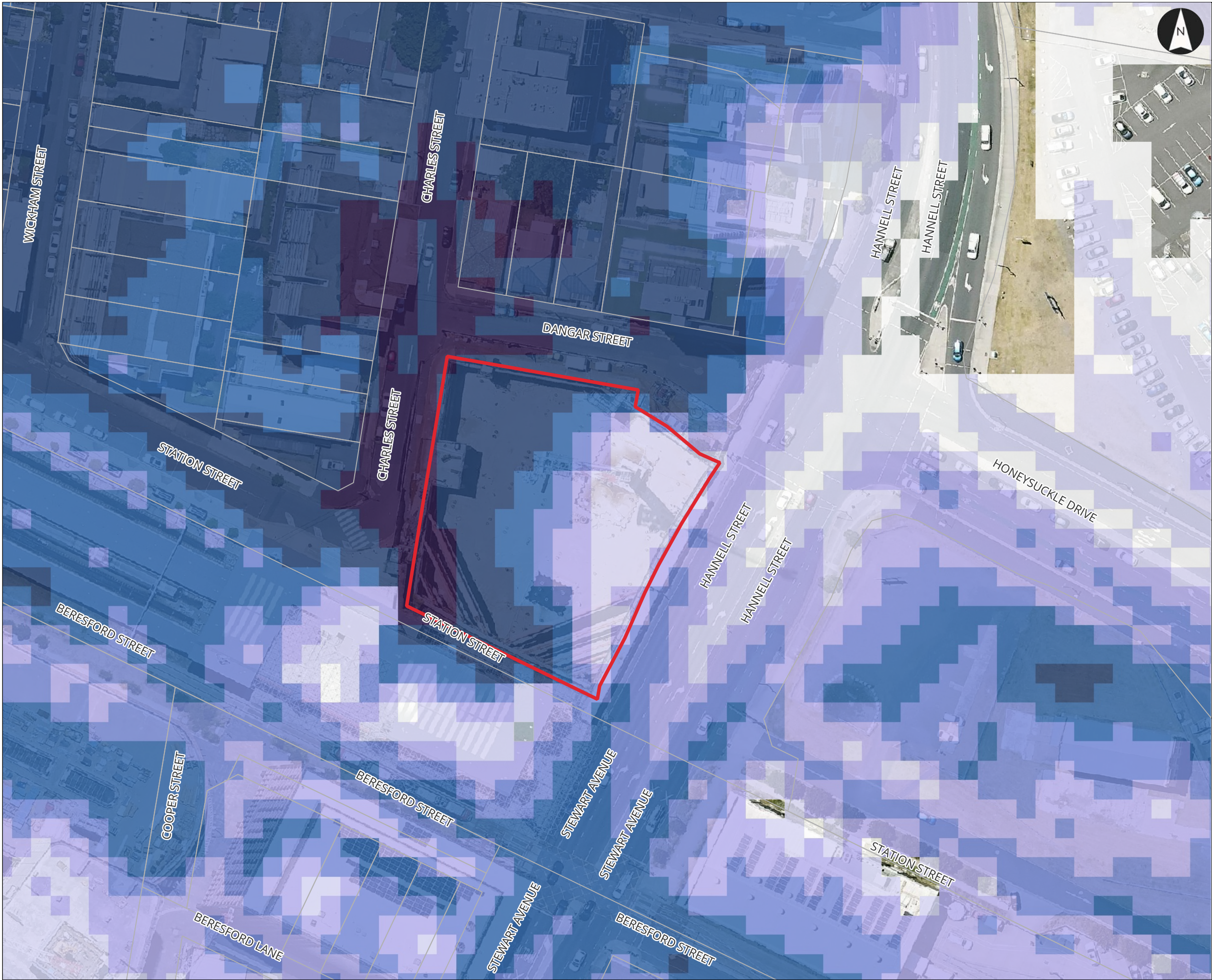
Notes:
1. Map displayed in EPSG:28356

References:
1. Australia Latest Metromap
2. NSW Cadastre
2. NSW Road



Scale at A3: 1:750





**PMF Flood Depths
Benchmark Conditions**

Project: Flood Impact Risk Assessment
10 Dangar Street, Wickham

Client: Urban Property Group
Project Code: 300204409
Drawn By: JL, Checked By: SY
Date: (2026-03-24)

Figure No: **Figure E18**

Legend

-  Study Area
- Flood Depth (m)
-  0.00 to 0.10
 -  0.10 to 0.30
 -  0.30 to 0.50
 -  0.50 to 0.70
 -  0.70 to 1.00
 -  1.00 to 1.50
 -  > 1.50
 -  Cadastre

DRAFT - Not For Construction

Notes:
1. Map displayed in EPSG:28356

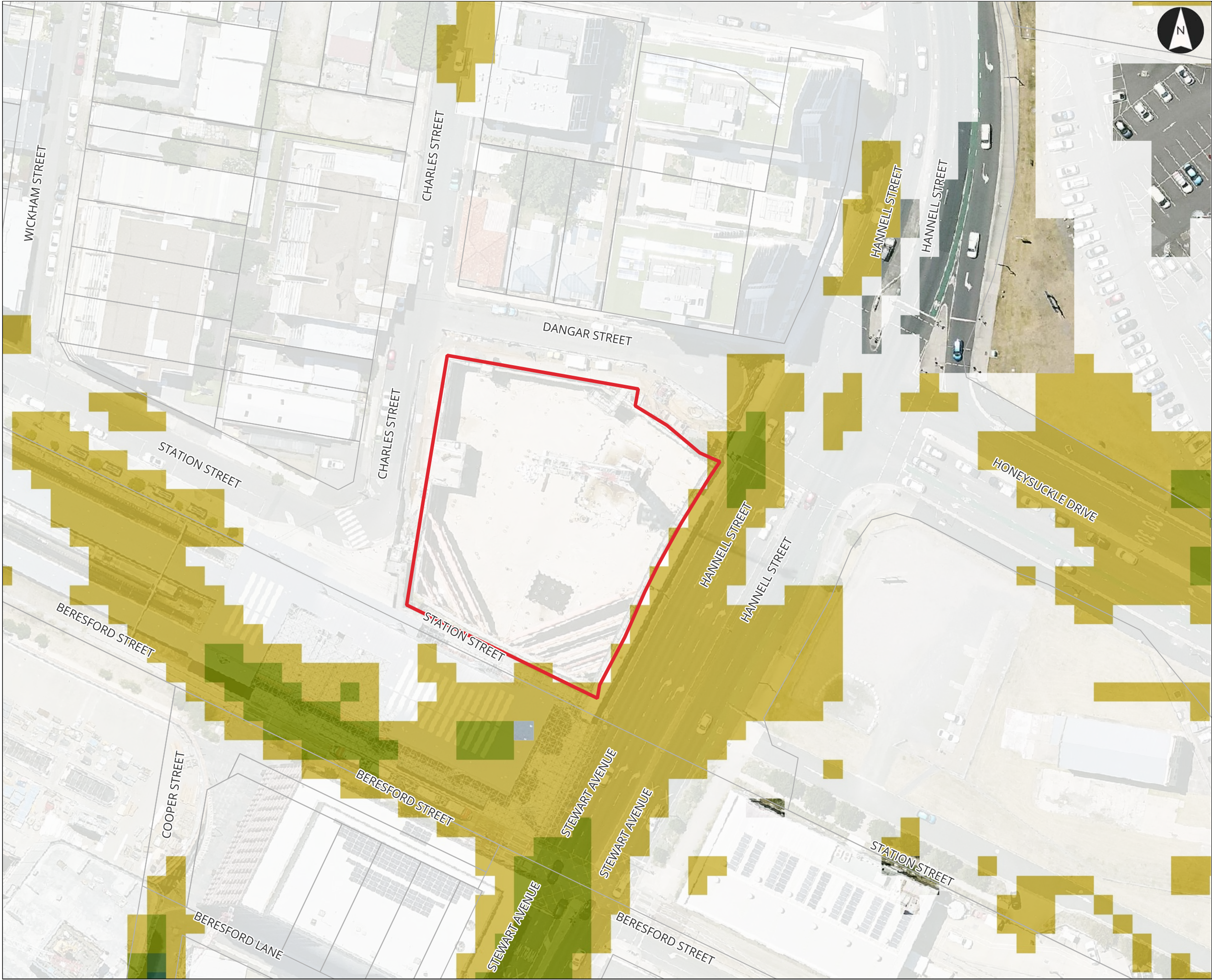
References:
1. Australia Latest Metromap
2. NSW Cadasre
2. NSW Road

 **Stantec**

7 0 7 14 21 28 m

Scale at A3: 1:750





**PMF Flood Velocities
Benchmark Conditions**

Project: Flood Impact Risk Assessment
10 Dangar Street, Wickham

Client: Urban Property Group

Project Code: 300204409

Drawn By: JL, Checked By: SY

Date: (2026-03-24)

Figure No: **Figure E19**

Legend

Study Area

Flood Velocity (m/s)

0.00 to 0.50

0.50 to 1.00

1.00 to 1.50

1.50 to 2.00

2.00 to 3.00

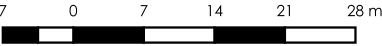
> 3.00

Cadastre

DRAFT - Not For Construction

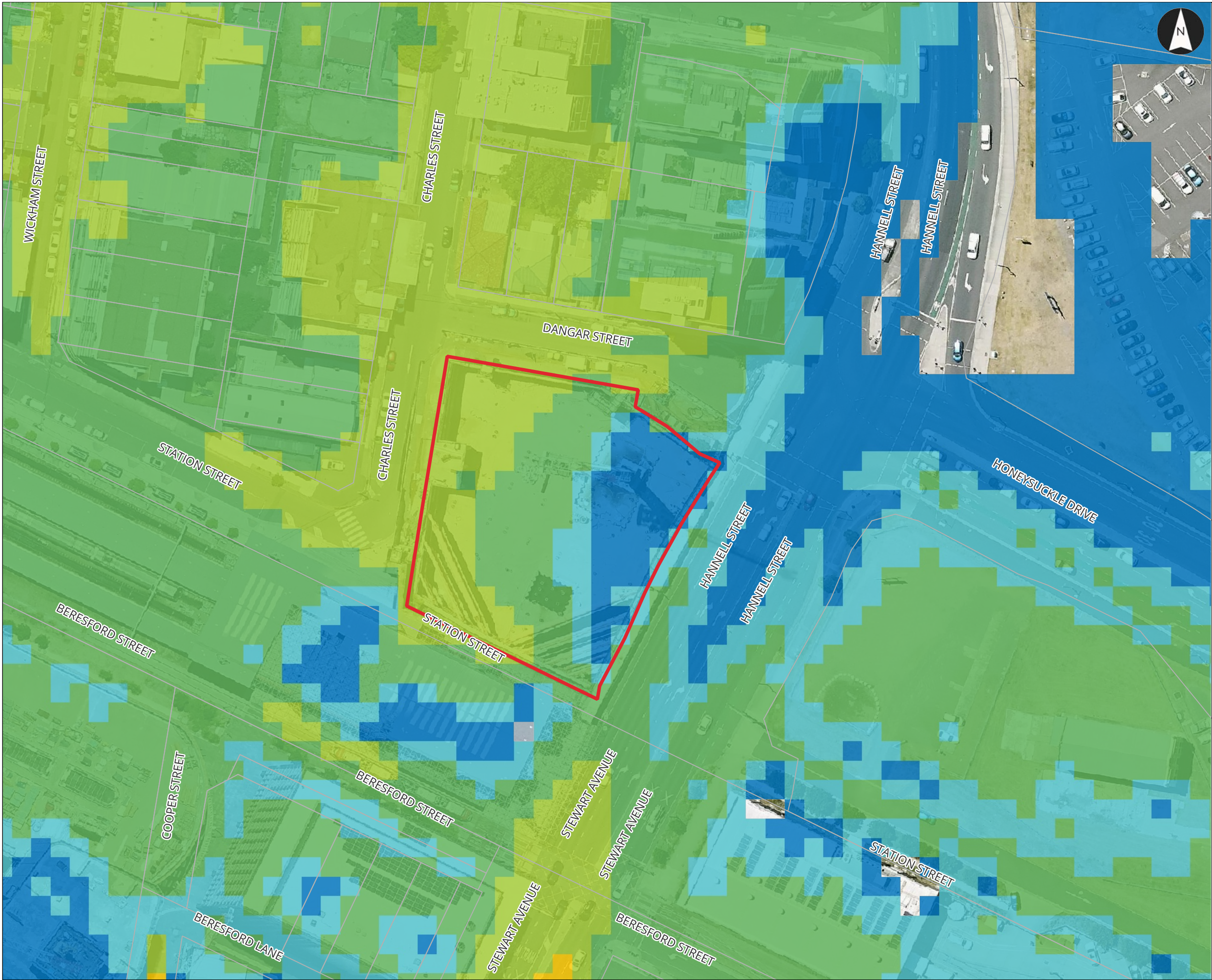
Notes:
1. Map displayed in EPSG:28356

References:
1. Australia Latest Metromap
2. NSW Cadastre
2. NSW Road



Scale at A3: 1:750





**PMF Flood Hazards
Benchmark Conditions**

Project: Flood Impact Risk Assessment
10 Dangar Street, Wickham

Client: Urban Property Group

Project Code: 300204409

Drawn By: JL, Checked By: SY

Date: (2026-03-24)

Figure No: **Figure E20**

Legend

Study Area

Flood Hazards (H1-H6)

H1 - Generally safe for vehicles, people and buildings.

H2 - Unsafe for small vehicles.

H3 - Unsafe for vehicles, children and the elderly.

H4 - Unsafe for vehicles and people

H5 - Unsafe for vehicles and people
All buildings vulnerable to structural damage. Some less robust buildings subject to failure.

H6 - Unsafe for vehicles and people
All building types considered vulnerable to failure.

Cadastre

DRAFT - Not For Construction

Notes:

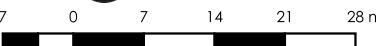
1. Map displayed in EPSG:28356

References:

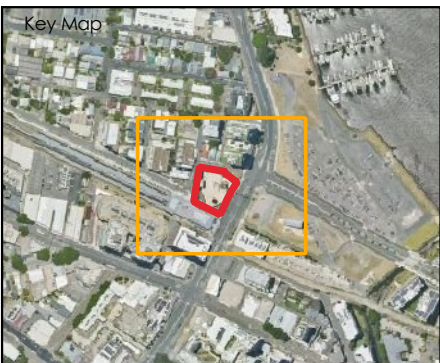
1. Australia Latest Metromap

2. NSW Cadastre

2. NSW Road



Scale at A3: 1:750



Appendix B Future Conditions





**5% AEP Flood Extents and Flood Levels
Future Conditions**

Project: Flood Impact Risk Assessment
10 Dangar Street, Wickham

Client: Urban Property Group

Project Code: 300204409

Drawn By: SHP, Checked By: SY

Date: (2026-04-02)

Figure No: **Figure F1**

Legend

-  StudyArea
-  0.1m Water Level Contours (mAHD)
-  Flood Extent
-  Cadastre

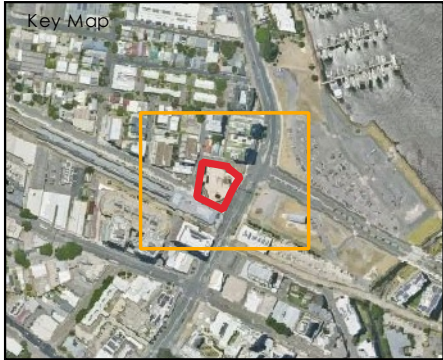
DRAFT - Not For Construction

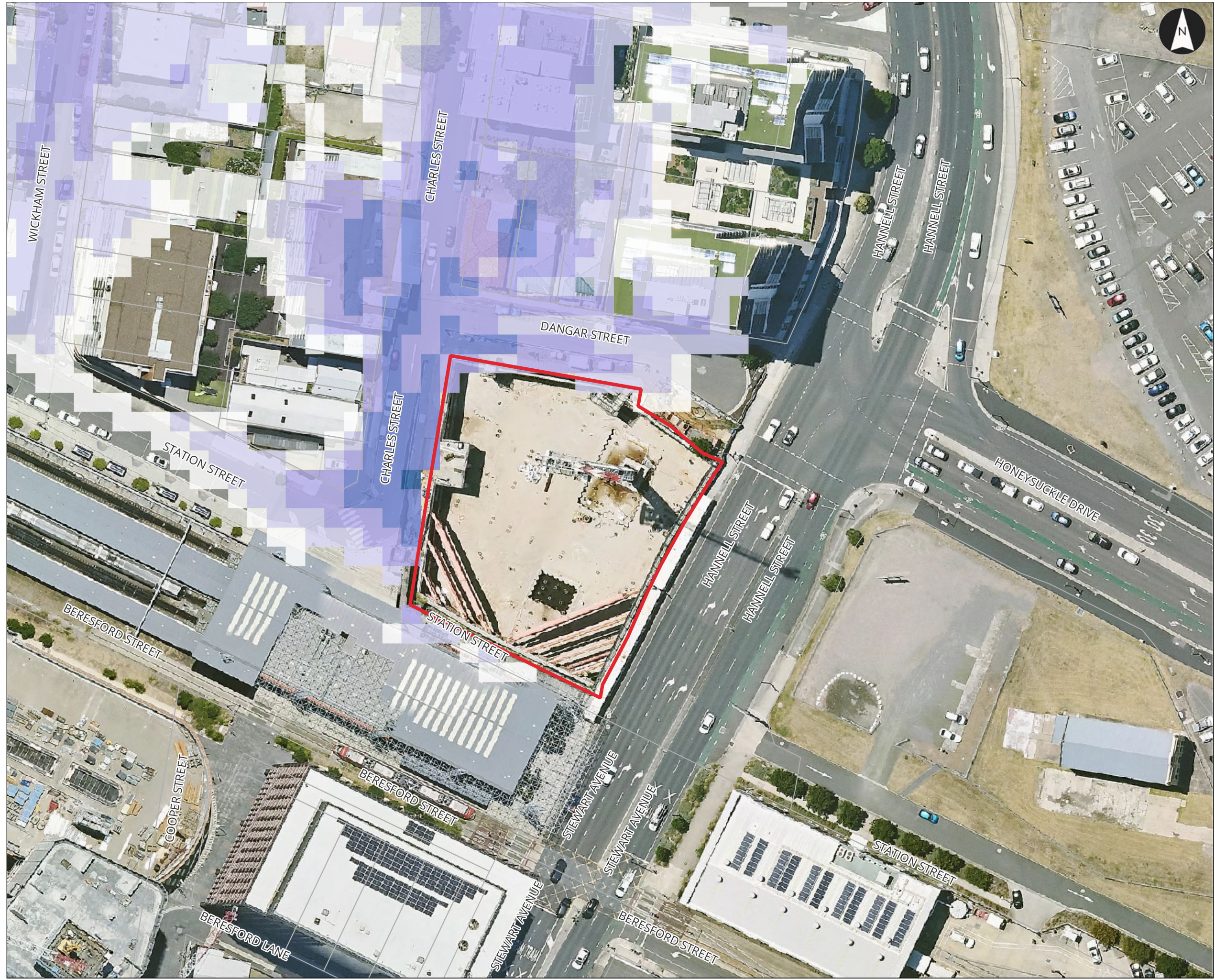
Notes:
1. Map displayed in EPSG:28356

References:
1. Australia Latest Metromap
2. NSW Cadasre
2. NSW Road



Scale at A3: 1:750





**5% AEP Flood Depths
Future Conditions**

Project: Flood Impact Risk Assessment
10 Dargar Street, Wickham

Client: Urban Property Group
Project Code: 300204409
Drawn By: SHP, Checked By: SY
Date: (2026-04-02)

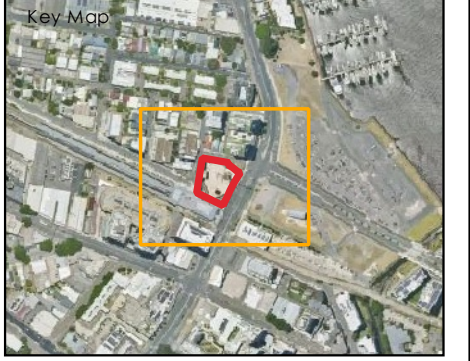
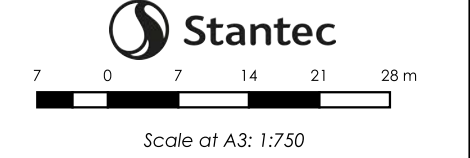
Figure No: **Figure F2**

- Legend**
- StudyArea
 - Flood Depth (m)
 - 0.00 to 0.10
 - 0.10 to 0.30
 - 0.30 to 0.50
 - 0.50 to 0.70
 - 0.70 to 1.00
 - 1.00 to 1.50
 - > 1.50
 - Cadastre

DRAFT - Not For Construction

Notes:
1. Map displayed in EPSG:28356

References:
1. Australia Latest Metromap
2. NSW Cadasre
2. NSW Road





5% AEP Flood Velocities Future Conditions

Project: Flood Impact Risk Assessment
10 Dangar Street, Wickham

Client: Urban Property Group
Project Code: 300204409
Drawn By: SHP, Checked By: SY
Date: (2026-04-02)

Figure No: **Figure F3**

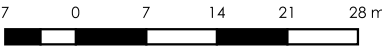
Legend

-  StudyArea
- Flood Velocity (m/s)
 -  0.00 to 0.50
 -  0.50 to 1.00
 -  1.00 to 1.50
 -  1.50 to 2.00
 -  2.00 to 3.00
 -  > 3.00
 -  Cadastre

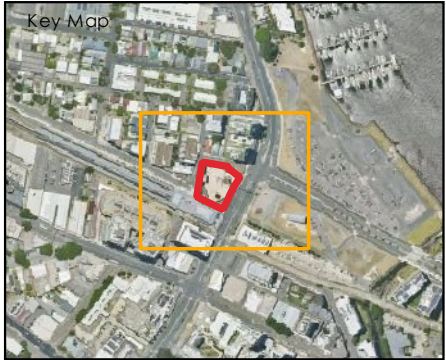
DRAFT - Not For Construction

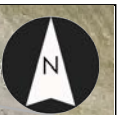
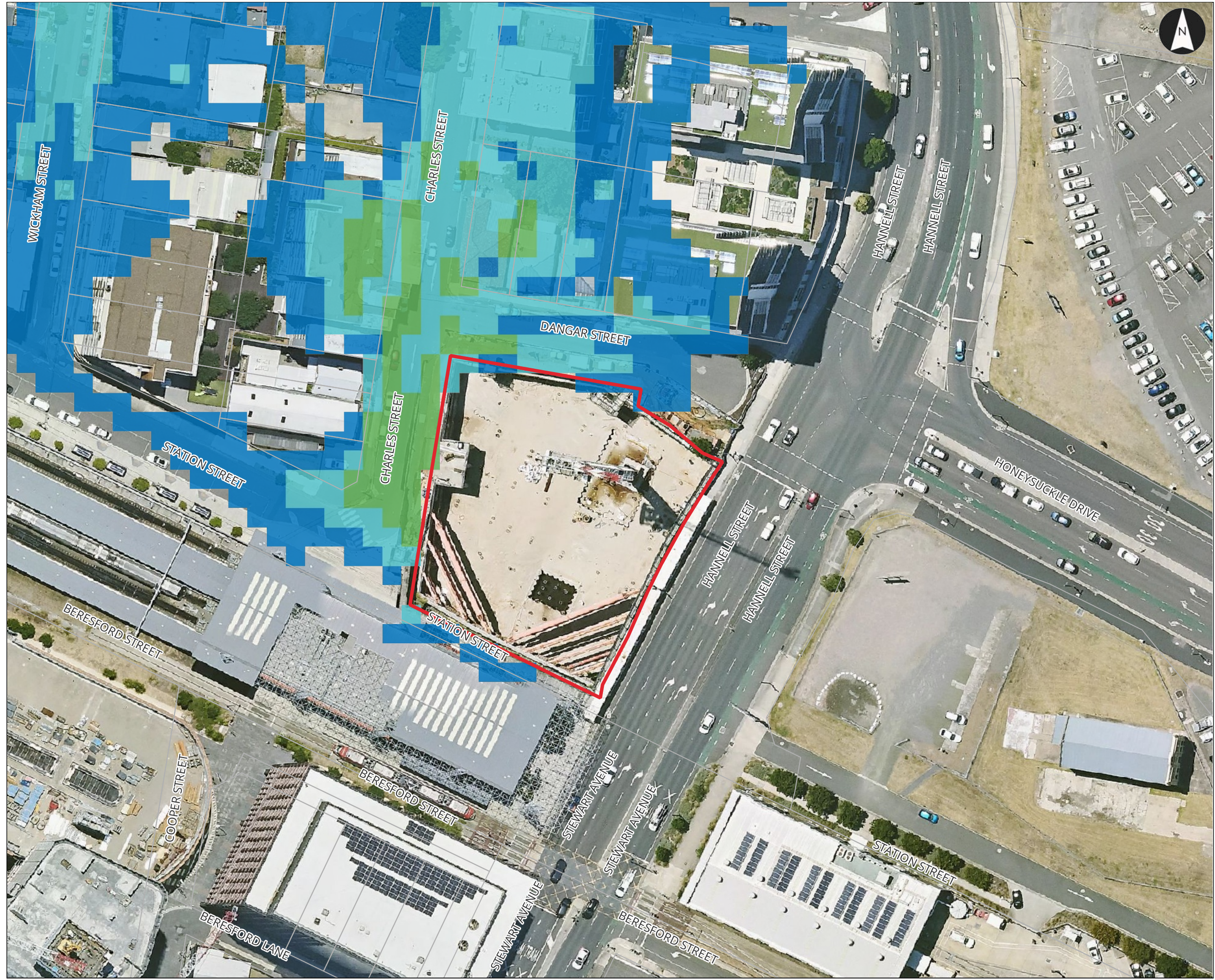
Notes:
1. Map displayed in EPSG:28356

References:
1. Australia Latest Metromap
2. NSW Cadasre
2. NSW Road



Scale at A3: 1:750





**5% AEP Flood Hazards
Future Conditions**

Project: Flood Impact Risk Assessment
10 Dangar Street, Wickham

Client: Urban Property Group

Project Code: 300204409

Drawn By: SHP, Checked By: SY

Date: (2026-04-02)

Figure No: **Figure F4**

Legend

StudyArea

Flood Hazard (H1 - H6)

- H1 - Generally safe for vehicles, people and buildings.
- H2 - Unsafe for small vehicles.
- H3 - Unsafe for vehicles, children and the elderly.
- H4 - Unsafe for vehicles and people
- H5 - Unsafe for vehicles and people
All buildings vulnerable to structural damage. Some less robust buildings subject to failure.
- H6 - Unsafe for vehicles and people
All building types considered vulnerable to failure.
- Cadastre

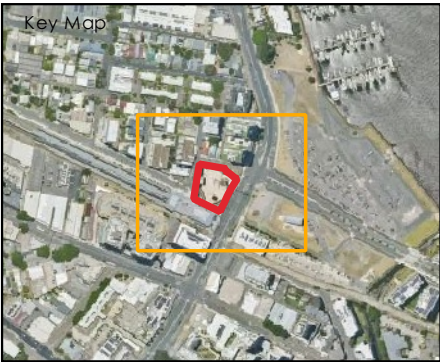
DRAFT - Not For Construction

Notes:
1. Map displayed in EPSG:28356

References:
1. Australia Latest Metromap
2. NSW Cadasre
2. NSW Road



Scale at A3: 1:750





**1% AEP Flood Extents and Flood Levels
Future Conditions**

Project: Flood Impact Risk Assessment
10 Dangar Street, Wickham

Client: Urban Property Group

Project Code: 300204409

Drawn By: SHP, Checked By: SY

Date: (2026-04-02)

Figure No: **Figure F5**

Legend

- StudyArea
- 0.1m Water Level Contours (mAHD)
- Flood Extent
- Cadastre

DRAFT - Not For Construction

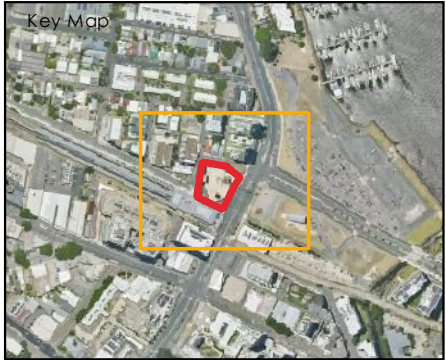
Notes:
1. Map displayed in EPSG:28356

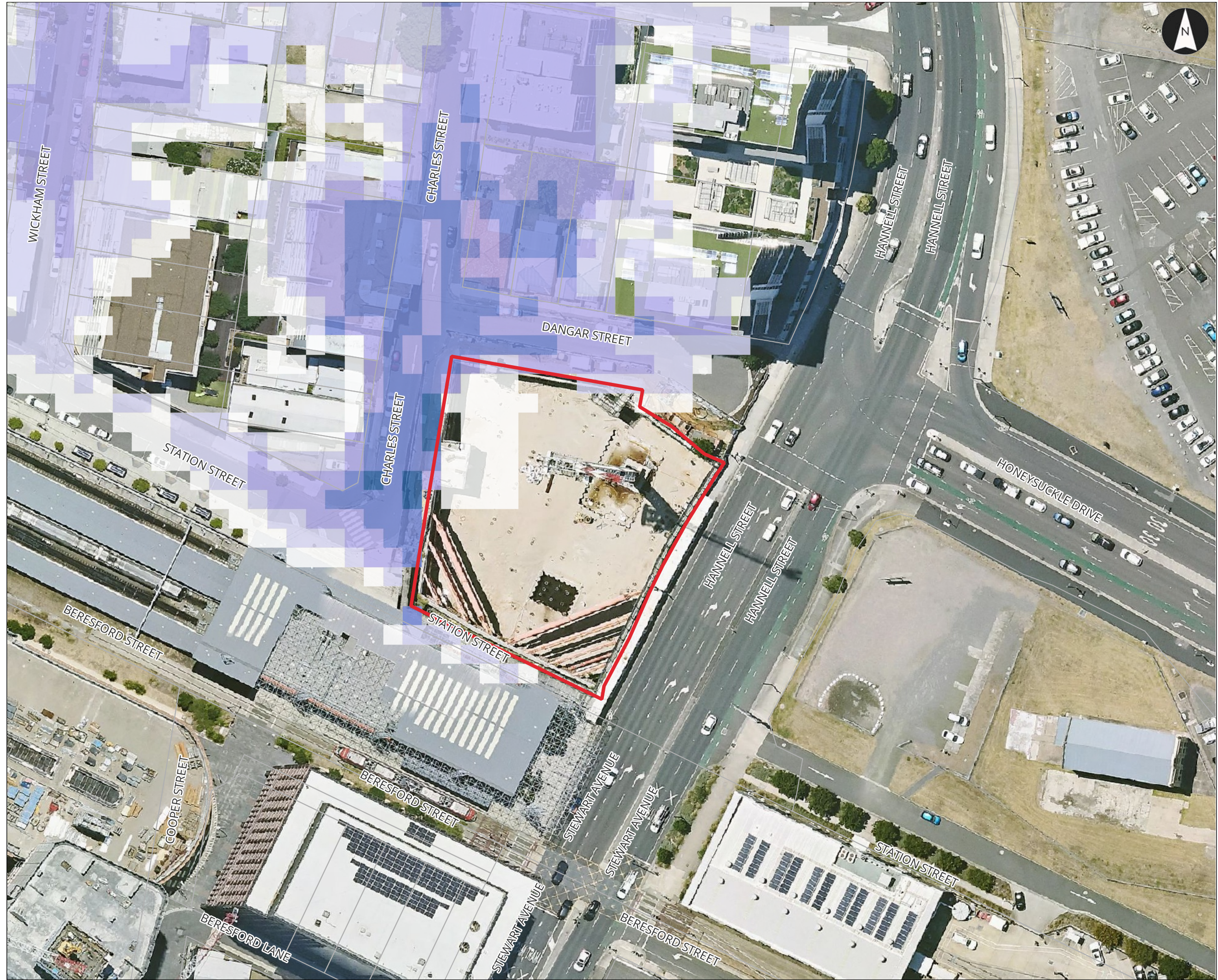
References:
1. Australia Latest Metromap
2. NSW Cadasre
2. NSW Road



7 0 7 14 21 28 m

Scale at A3: 1:750





**1% AEP Flood Depths
Future Conditions**

Project: Flood Impact Risk Assessment
10 Dangar Street, Wickham

Client: Urban Property Group

Project Code: 300204409

Drawn By: SHP, Checked By: SY

Date: (2026-04-02)

Figure No: **Figure F6**

Legend

 StudyArea

Flood Depth (m)

 0.00 to 0.10

 0.10 to 0.30

 0.30 to 0.50

 0.50 to 0.70

 0.70 to 1.00

 1.00 to 1.50

 > 1.50

 Cadastre

DRAFT - Not For Construction

Notes:

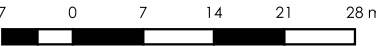
1. Map displayed in EPSG:28356

References:

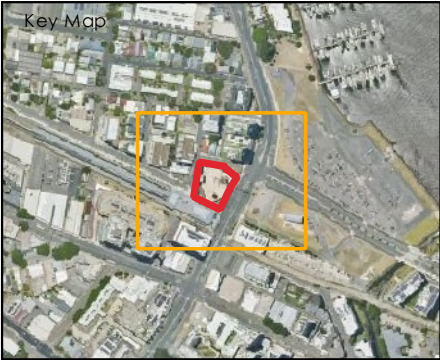
1. Australia Latest Metromap

2. NSW Cadasre

2. NSW Road



Scale at A3: 1:750





**1% AEP Flood Velocities
Future Conditions**

Project: Flood Impact Risk Assessment
10 Dangar Street, Wickham

Client: Urban Property Group
Project Code: 300204409
Drawn By: SHP, Checked By: SY
Date: (2026-04-02)

Figure No: **Figure F7**

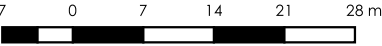
Legend

-  StudyArea
- Flood Velocity (m/s)
-  0.00 to 0.50
 -  0.50 to 1.00
 -  1.00 to 1.50
 -  1.50 to 2.00
 -  2.00 to 3.00
 -  > 3.00
 -  Cadastre

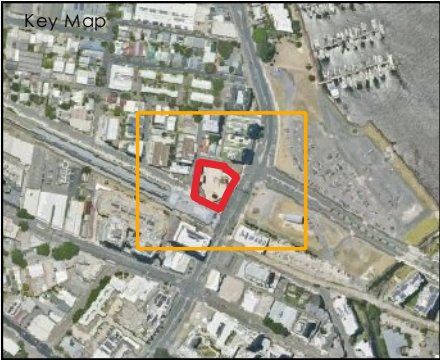
DRAFT - Not For Construction

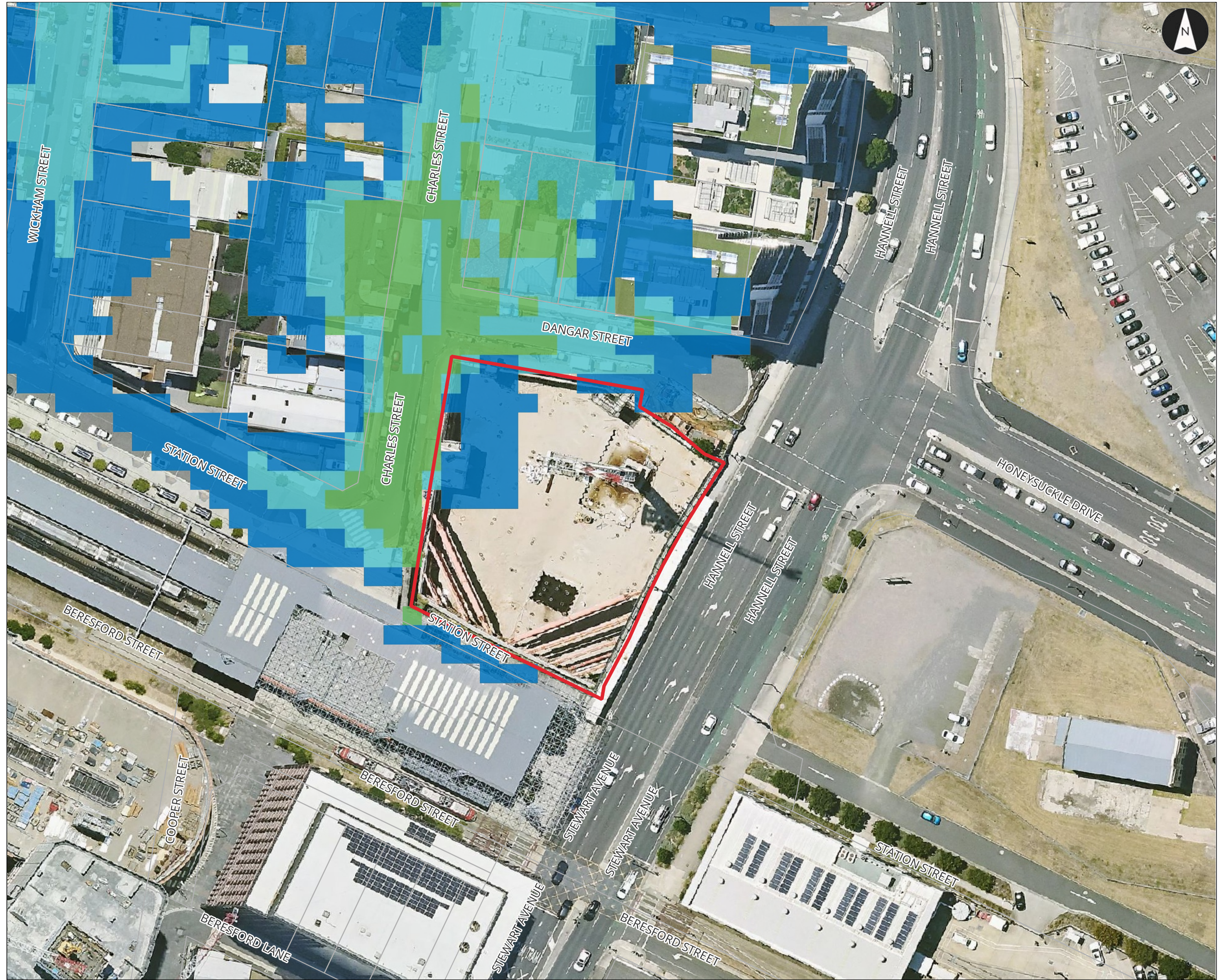
Notes:
1. Map displayed in EPSG:28356

References:
1. Australia Latest Metromap
2. NSW Cadasre
2. NSW Road



Scale at A3: 1:750





**1% AEP Flood Hazards
Future Conditions**

Project: Flood Impact Risk Assessment
10 Dangar Street, Wickham

Client: Urban Property Group

Project Code: 300204409

Drawn By: SHP, Checked By: SY

Date: (2026-04-02)

Figure No: **Figure F8**

Legend

StudyArea

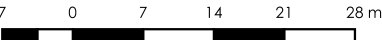
Flood Hazard (H1 - H6)

- H1 - Generally safe for vehicles, people and buildings.
- H2 - Unsafe for small vehicles.
- H3 - Unsafe for vehicles, children and the elderly.
- H4 - Unsafe for vehicles and people
- H5 - Unsafe for vehicles and people
All buildings vulnerable to structural damage. Some less robust buildings subject to failure.
- H6 - Unsafe for vehicles and people
All building types considered vulnerable to failure.
- Cadastre

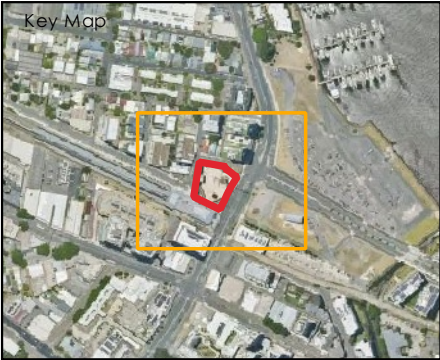
DRAFT - Not For Construction

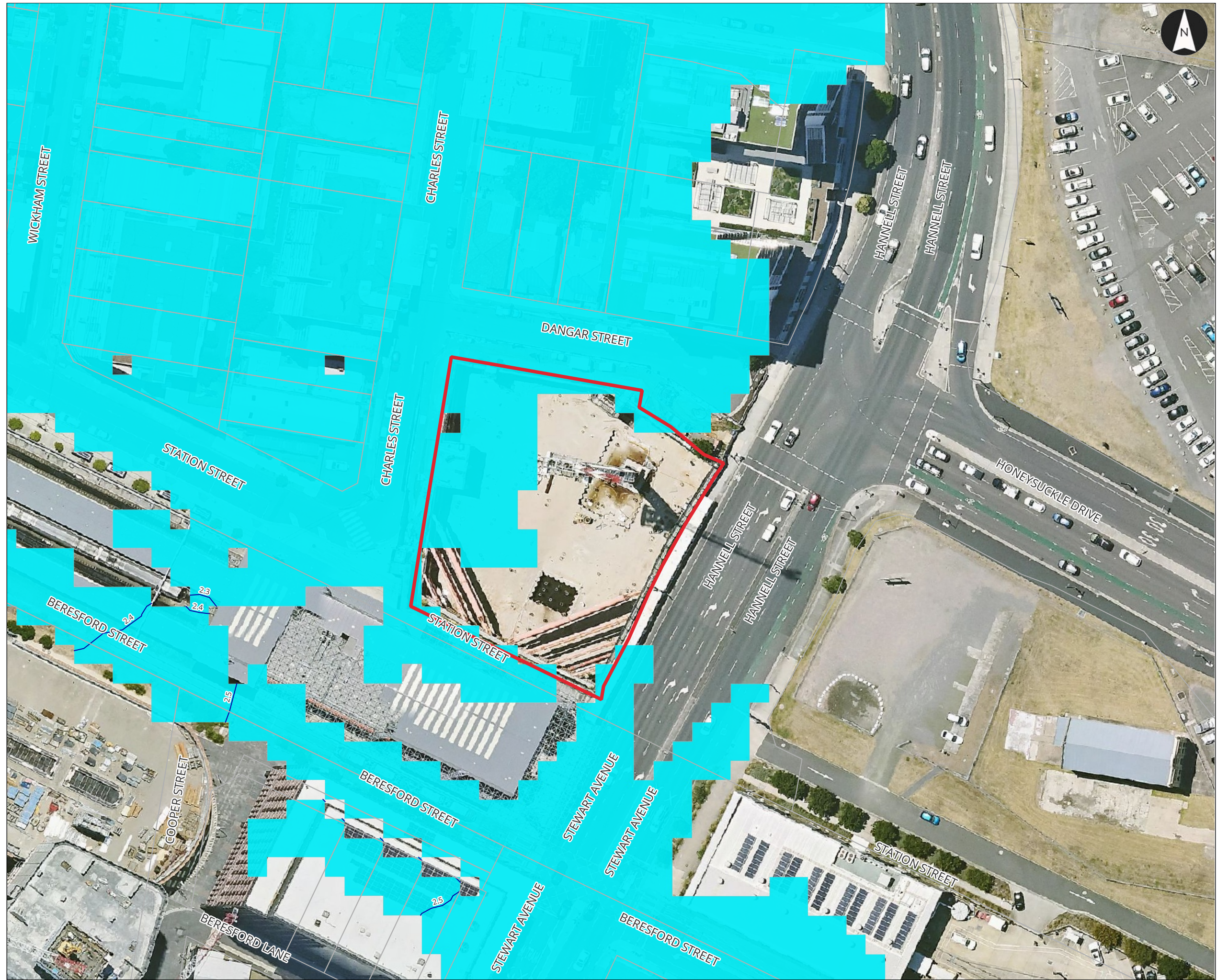
Notes:
1. Map displayed in EPSG:28356

References:
1. Australia Latest Metromap
2. NSW Cadasre
2. NSW Road



Scale at A3: 1:750





**1% AEP in 2050 Flood Extents and Flood Levels
Future Conditions**

Project: Flood Impact Risk Assessment
10 Dangar Street, Wickham

Client: Urban Property Group
Project Code: 300204409
Drawn By: SHP, Checked By: SY
Date: (2026-04-02)

Figure No: **Figure F9**

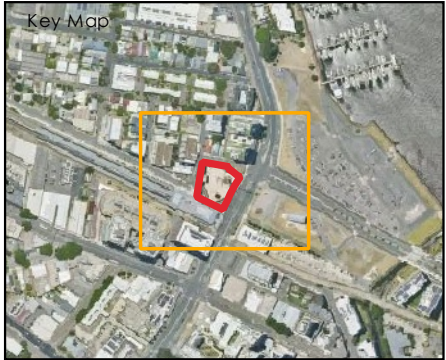
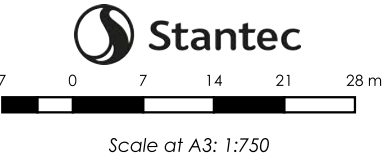
Legend

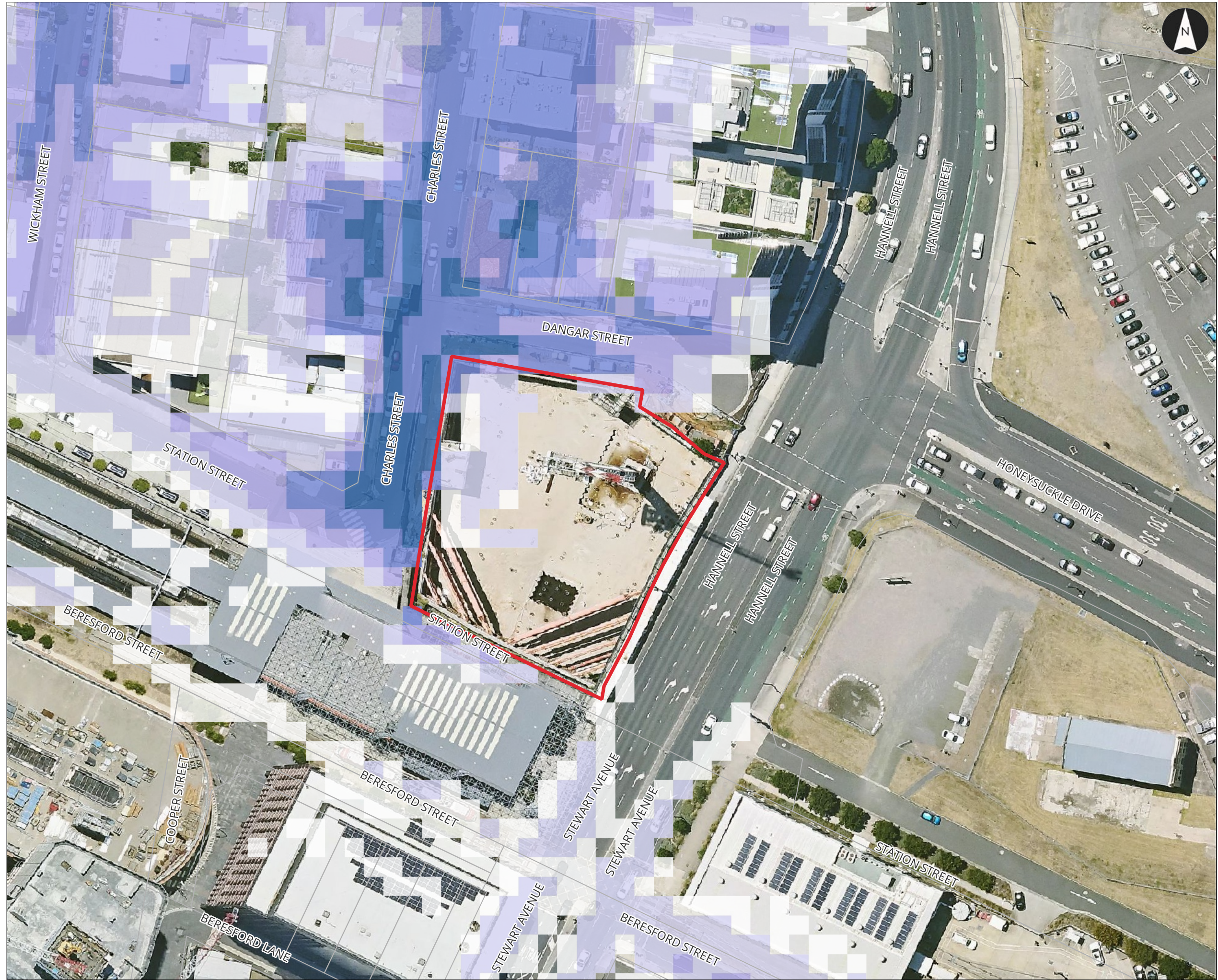
- StudyArea
- 0.1m Water Level Contours (mAHD)
- Flood Extent
- Cadastre

DRAFT - Not For Construction

Notes:
1. Map displayed in EPSG:28356

References:
1. Australia Latest Metromap
2. NSW Cadasre
2. NSW Road





**1% AEP in 2050 Flood Depths
Future Conditions**

Project: Flood Impact Risk Assessment
10 Dangar Street, Wickham

Client: Urban Property Group
Project Code: 300204409
Drawn By: SHP, Checked By: SY
Date: (2026-04-02)

Figure No: **Figure F10**

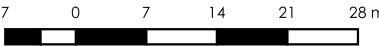
Legend

-  StudyArea
- Flood Depth (m)
-  0.00 to 0.10
 -  0.10 to 0.30
 -  0.30 to 0.50
 -  0.50 to 0.70
 -  0.70 to 1.00
 -  1.00 to 1.50
 -  > 1.50
 -  Cadastre

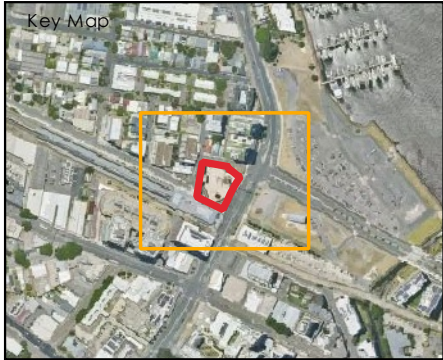
DRAFT - Not For Construction

Notes:
1. Map displayed in EPSG:28356

References:
1. Australia Latest Metromap
2. NSW Cadasre
2. NSW Road



Scale at A3: 1:750





1% AEP in 2050 Flood Velocities Future Conditions

Project: Flood Impact Risk Assessment
10 Dargar Street, Wickham

Client: Urban Property Group

Project Code: 300204409

Drawn By: SHP, Checked By: SY

Date: (2026-04-02)

Figure No: **Figure F11**

Legend

-  StudyArea
- Flood Velocity (m/s)
 -  0.00 to 0.50
 -  0.50 to 1.00
 -  1.00 to 1.50
 -  1.50 to 2.00
 -  2.00 to 3.00
 -  > 3.00
 -  Cadastre

DRAFT - Not For Construction

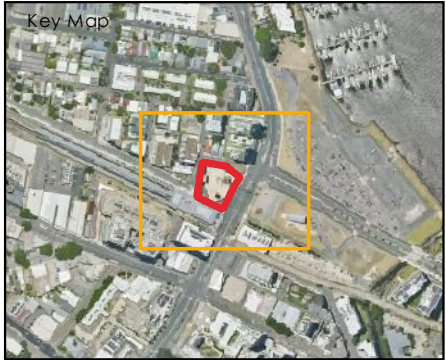
Notes:
1. Map displayed in EPSG:28356

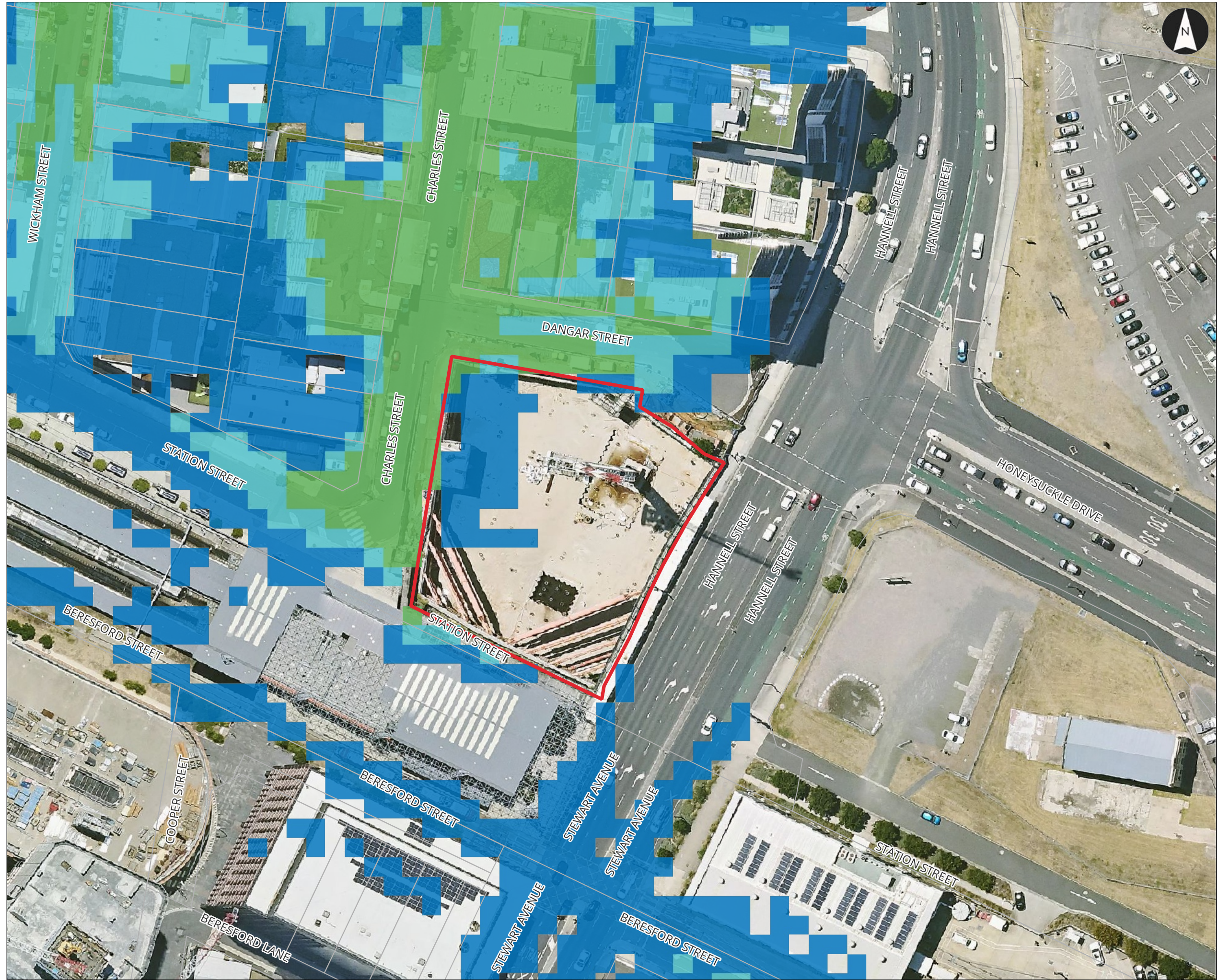
References:
1. Australia Latest Metromap
2. NSW Cadasre
2. NSW Road



7 0 7 14 21 28 m

Scale at A3: 1:750





1% AEP in 2050 Flood Hazards Future Conditions

Project: Flood Impact Risk Assessment
10 Dangar Street, Wickham

Client: Urban Property Group
Project Code: 300204409
Drawn By: SHP, Checked By: SY
Date: (2026-04-02)

Figure No: **Figure F12**

Legend

StudyArea

Flood Hazard (H1 - H6)

- H1 - Generally safe for vehicles, people and buildings.
- H2 - Unsafe for small vehicles.
- H3 - Unsafe for vehicles, children and the elderly.
- H4 - Unsafe for vehicles and people
- H5 - Unsafe for vehicles and people
All buildings vulnerable to structural damage. Some less robust buildings subject to failure.
- H6 - Unsafe for vehicles and people
All building types considered vulnerable to failure.
- Cadastre

DRAFT - Not For Construction

Notes:
1. Map displayed in EPSG:28356

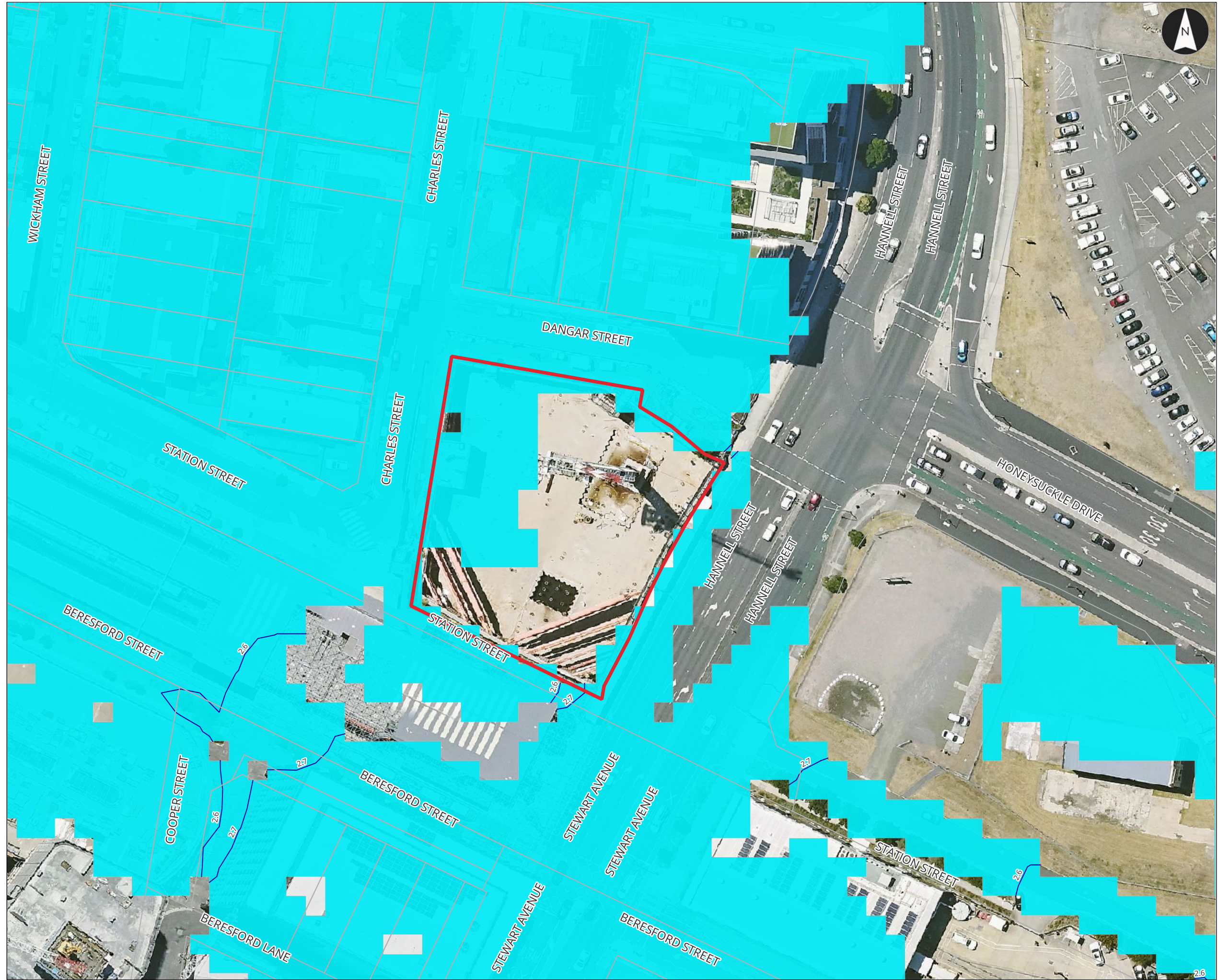
References:
1. Australia Latest Metromap
2. NSW Cadasre
2. NSW Road

Stantec

7 0 7 14 21 28 m

Scale at A3: 1:750





**1%AEP in 2100 Flood Extents and Flood Levels
Future Conditions**

Project: Flood Impact Risk Assessment
10 Dangar Street, Wickham

Client: Urban Property Group
Project Code: 300204409
Drawn By: SHP, Checked By: SY
Date: (2026-04-02)

Figure No: **Figure F13**

Legend

- StudyArea
- 0.1m Water Level Contours (mAHD)
- Flood Extent
- Cadastre

DRAFT - Not For Construction

Notes:
1. Map displayed in EPSG:28356

References:
1. Australia Latest Metromap
2. NSW Cadasre
2. NSW Road

Stantec

7 0 7 14 21 28 m

Scale at A3: 1:750

Key Map



**1% AEP in 2100 Flood Depths
Future Conditions**

Project: Flood Impact Risk Assessment
10 Dangar Street, Wickham

Client: Urban Property Group
Project Code: 300204409
Drawn By: SHP, Checked By: SY
Date: (2026-04-02)

Figure No: **Figure F14**

- Legend**
- StudyArea
 - Flood Depth (m)
 - 0.00 to 0.10
 - 0.10 to 0.30
 - 0.30 to 0.50
 - 0.50 to 0.70
 - 0.70 to 1.00
 - 1.00 to 1.50
 - > 1.50
 - Cadastre

DRAFT - Not For Construction

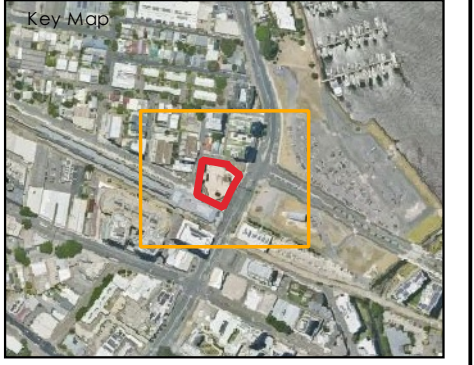
Notes:
1. Map displayed in EPSG:28356

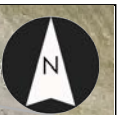
References:
1. Australia Latest Metromap
2. NSW Cadasre
2. NSW Road

Stantec

7 0 7 14 21 28 m

Scale at A3: 1:750





1% AEP in 2100 Flood Velocities Future Conditions

Project: Flood Impact Risk Assessment
10 Dangar Street, Wickham

Client: Urban Property Group
Project Code: 300204409
Drawn By: SHP, Checked By: SY
Date: (2026-04-02)

Figure No: **Figure F15**

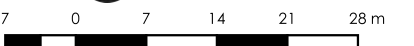
Legend

-  StudyArea
- Flood Velocity (m/s)
 -  0.00 to 0.50
 -  0.50 to 1.00
 -  1.00 to 1.50
 -  1.50 to 2.00
 -  2.00 to 3.00
 -  > 3.00
 -  Cadastre

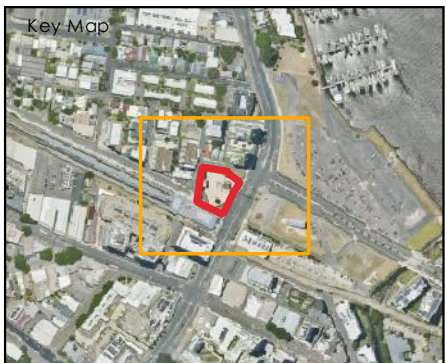
DRAFT - Not For Construction

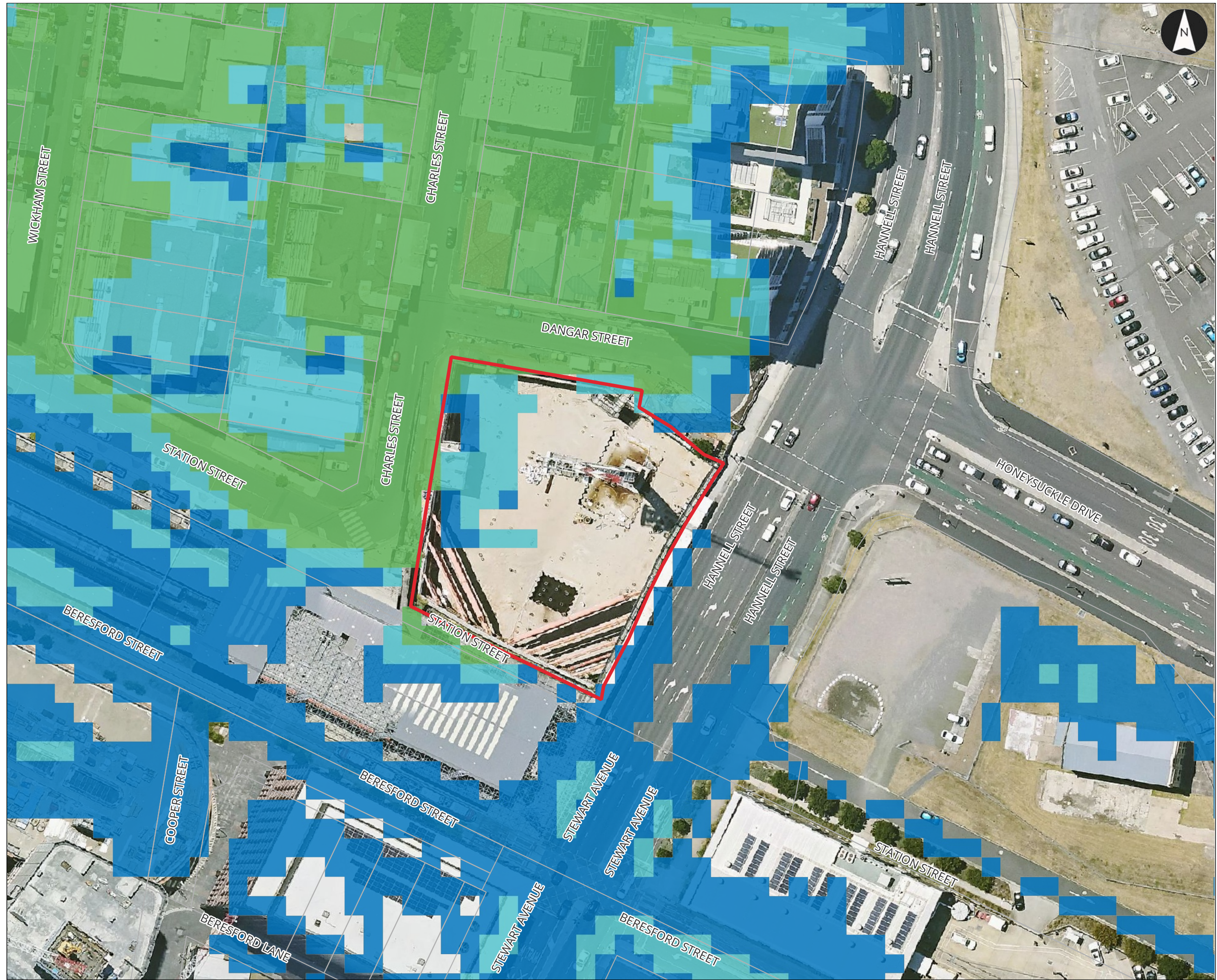
Notes:
1. Map displayed in EPSG:28356

References:
1. Australia Latest Metromap
2. NSW Cadasre
2. NSW Road



Scale at A3: 1:750





1%AEP in 2100 Flood Hazards Future Conditions

Project: Flood Impact Risk Assessment
10 Dangar Street, Wickham

Client: Urban Property Group

Project Code: 300204409

Drawn By: SHP, Checked By: SY

Date: (2026-04-02)

Figure No: **Figure F16**

Legend

StudyArea

Flood Hazard (H1 - H6)

H1 - Generally safe for vehicles, people and buildings.

H2 - Unsafe for small vehicles.

H3 - Unsafe for vehicles, children and the elderly.

H4 - Unsafe for vehicles and people

H5 - Unsafe for vehicles and people
All buildings vulnerable to structural damage. Some less robust buildings subject to failure.

H6 - Unsafe for vehicles and people
All building types considered vulnerable to failure.

Cadastre

DRAFT - Not For Construction

Notes:

1. Map displayed in EPSG:28356

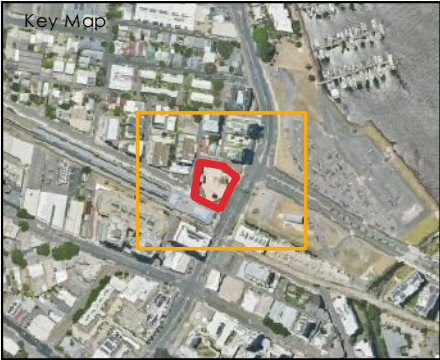
References:

1. Australia Latest Metromap
2. NSW Cadasre
2. NSW Road



7 0 7 14 21 28 m

Scale at A3: 1:750





PMF Flood Extents and Flood Levels
Future Conditions

Project: Flood Impact Risk Assessment
10 Dangar Street, Wickham

Client: Urban Property Group
Project Code: 300204409
Drawn By: SHP, Checked By: SY
Date: (2026-04-02)

Figure No: **Figure F17**

Legend

- StudyArea
- Cadastre
- 0.1m Water Level Contours (mAHD)
- Flood Extent

DRAFT - Not For Construction

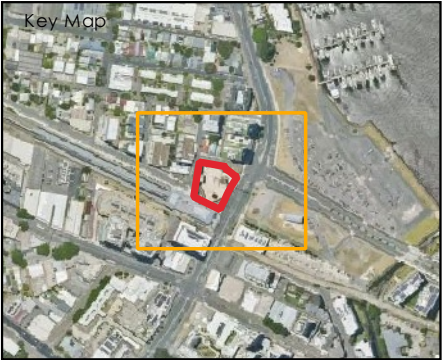
Notes:
1. Map displayed in EPSG:28356

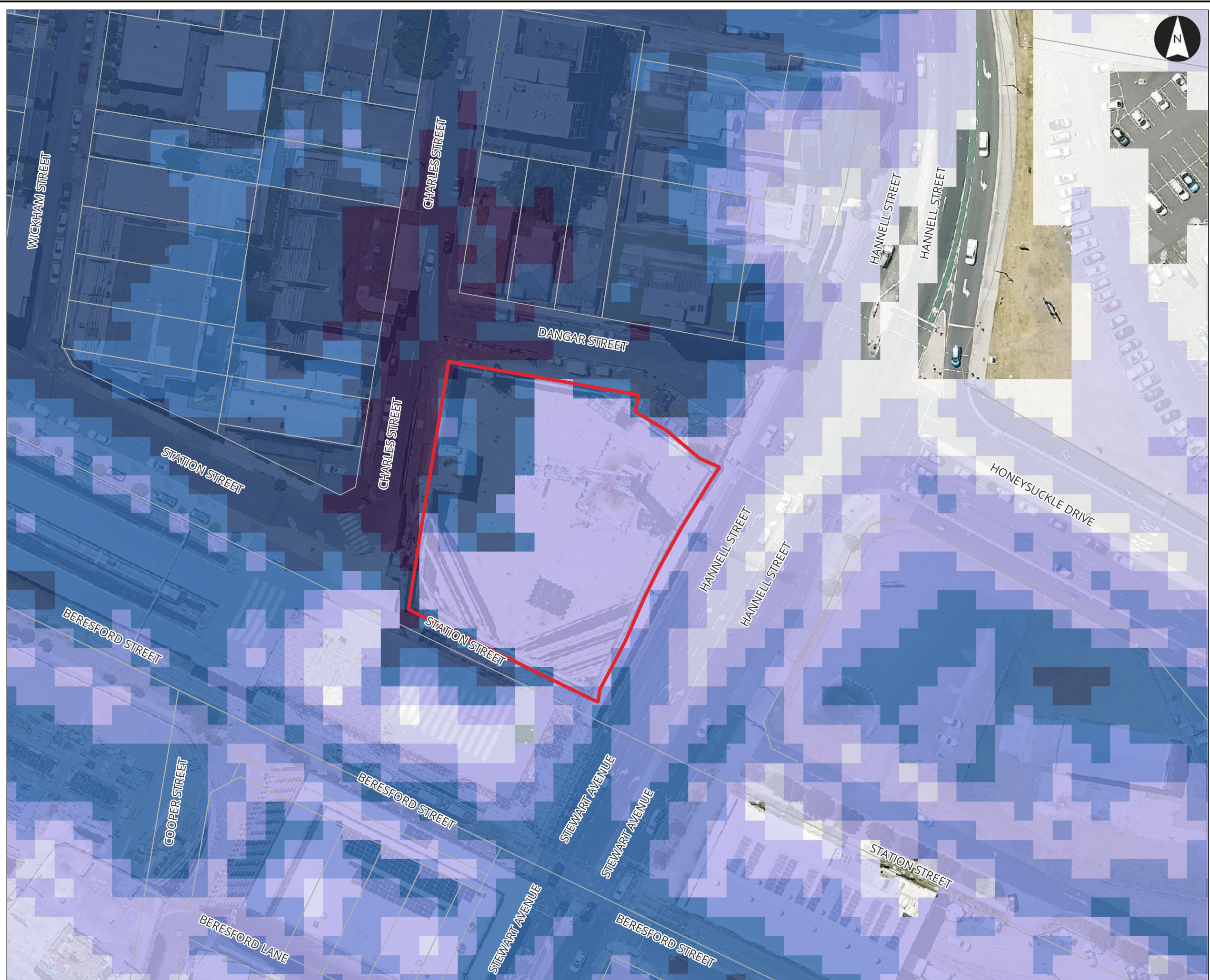
References:
1. Australia Latest Metromap
2. NSW Cadastre
2. NSW Road

Stantec

7 0 7 14 21 28 m

Scale at A3: 1:750





**PMF Flood Depths
Future Conditions**

Project: Flood Impact Risk Assessment
10 Dangar Street, Wickham

Client: Urban Property Group

Project Code: 300204409

Drawn By: SHP, Checked By: SY

Date: (2026-04-02)

Figure No: **Figure F18**

Legend

StudyArea

Cadastre

Flood Depth (m)

0.00 to 0.10

0.10 to 0.30

0.30 to 0.50

0.50 to 0.70

0.70 to 1.00

1.00 to 1.50

> 1.50

DRAFT - Not For Construction

Notes:

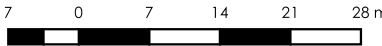
1. Map displayed in EPSG:28356

References:

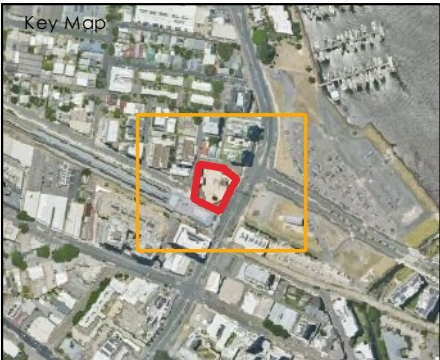
1. Australia Latest Metromap

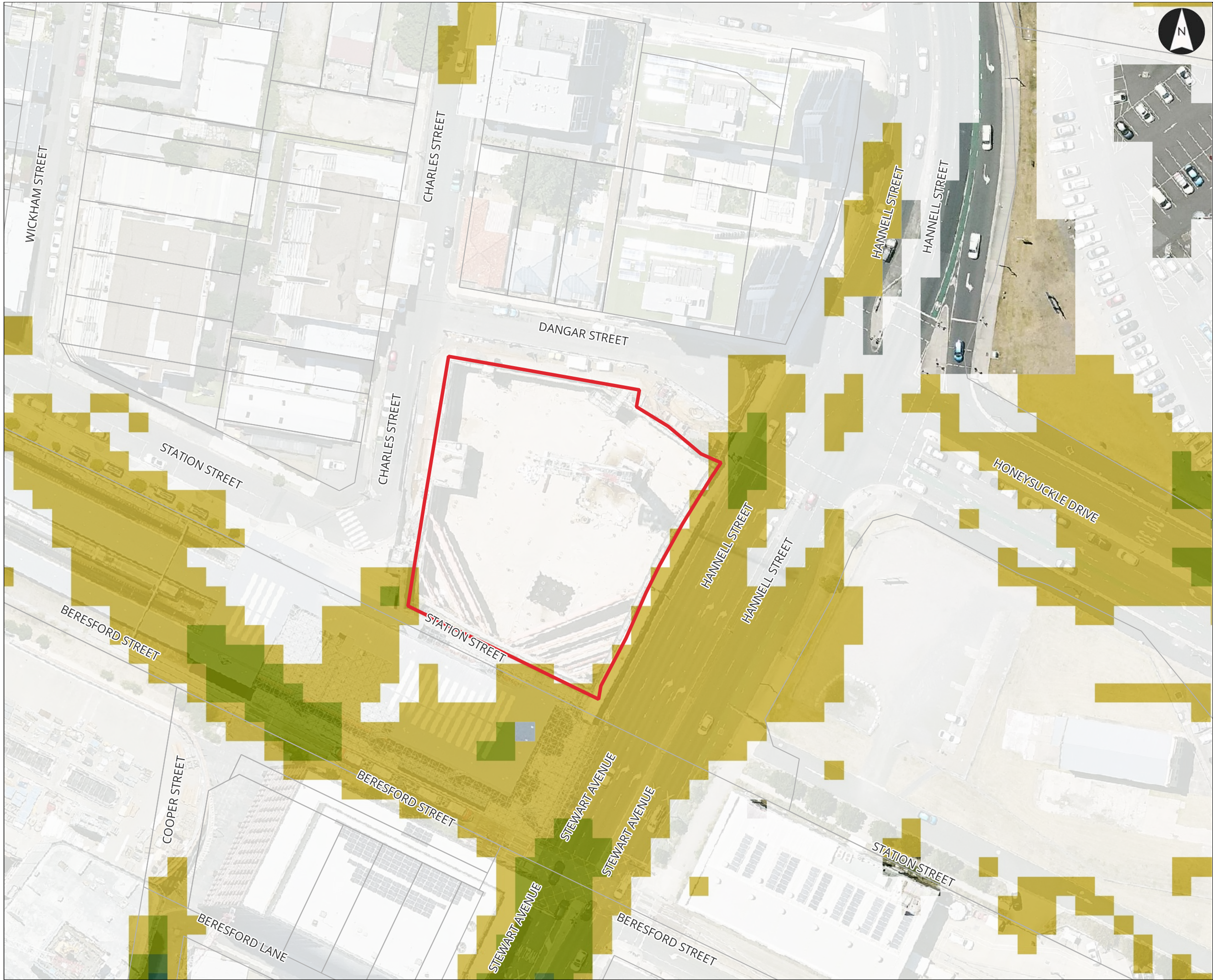
2. NSW Cadasre

2. NSW Road



Scale at A3: 1:750





**PMF Flood Velocities
Future Conditions**

Project: Flood Impact Risk Assessment
10 Dargar Street, Wickham

Client: Urban Property Group

Project Code: 300204409

Drawn By: SHP, Checked By: SY

Date: (2026-04-02)

Figure No: **Figure F19**

Legend

StudyArea

Cadastre

Flood Velocity (m/s)

0.00 to 0.50

0.50 to 1.00

1.00 to 1.50

1.50 to 2.00

2.00 to 3.00

> 3.00

DRAFT - Not For Construction

Notes:

1. Map displayed in EPSG:28356

References:

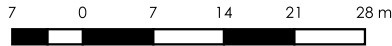
1. Australia Latest Metromap

2. NSW Cadastre

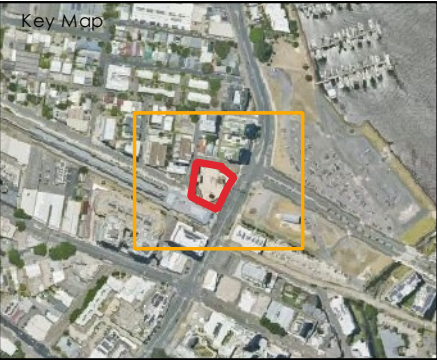
2. NSW Road

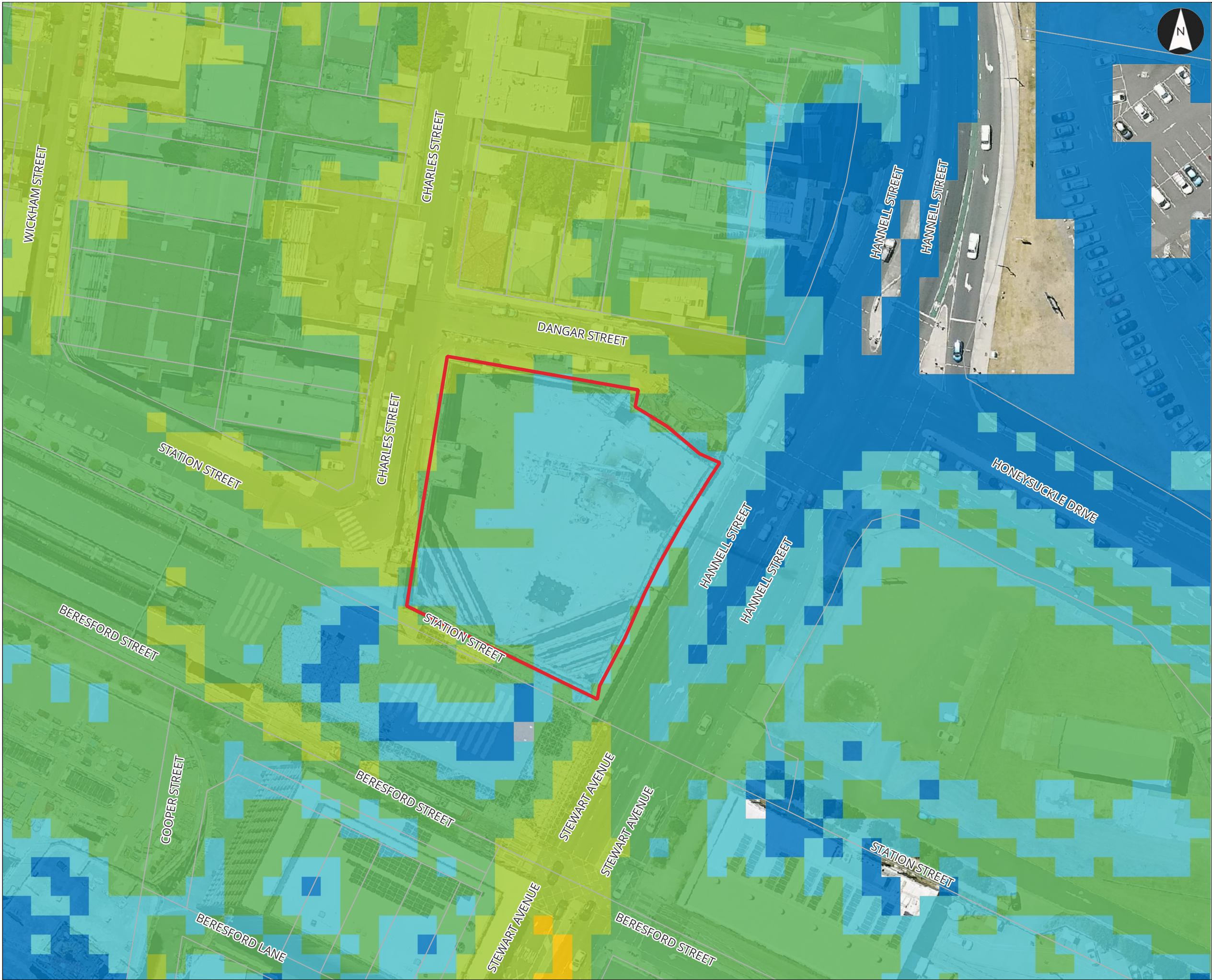


Stantec



Scale at A3: 1:750





**PMF Flood Hazards
Future Conditions**

Project: Flood Impact Risk Assessment
10 Dangar Street, Wickham

Client: Urban Property Group

Project Code: 300204409

Drawn By: SHP, Checked By: SY

Date: (2026-04-02)

Figure No: **Figure F20**

Legend

StudyArea

Cadastre

Flood Hazard (H1 - H6)

H1 - Generally safe for vehicles, people and buildings.

H2 - Unsafe for small vehicles.

H3 - Unsafe for vehicles, children and the elderly.

H4 - Unsafe for vehicles and people

H5 - Unsafe for vehicles and people
All buildings vulnerable to structural damage. Some less robust buildings subject to failure.

H6 - Unsafe for vehicles and people
All building types considered vulnerable to failure.

DRAFT - Not For Construction

Notes:

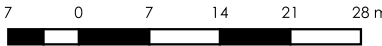
1. Map displayed in EPSG:28356

References:

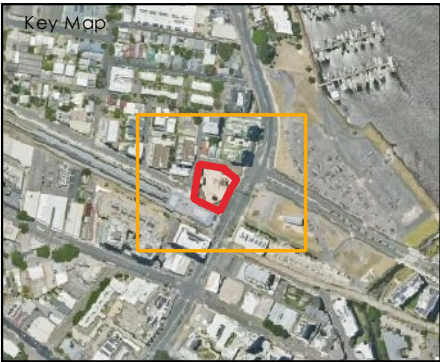
1. Australia Latest Metromap

2. NSW Cadasre

2. NSW Road



Scale at A3: 1:750



Appendix C Flood Impacts





5% AEP Flood Level Differences Future Conditions Less Benchmark Conditions

Project: Flood Impact Risk Assessment
10 Dargar Street, Wickham

Client: Urban Property Group

Project Code: 300204409

Drawn By: JL, Checked By: SY

Date: (2026-04-02)

Figure No: **Figure 11**

Legend

 StudyArea

Wet/Dry Analysis

 Was Wet, Now Dry

 Was Dry, Now Wet

Water Level Difference (m)

 < -0.50

 -0.50 to -0.30

 -0.30 to -0.10

 -0.10 to -0.05

 -0.05 to -0.01

 -0.01 to 0.01

 0.01 to 0.05

 0.05 to 0.10

 0.10 to 0.30

 0.30 to 0.50

 > 0.50

 Cadastre

DRAFT - Not For Construction

Notes:

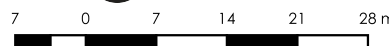
1. Map displayed in EPSG:28356

References:

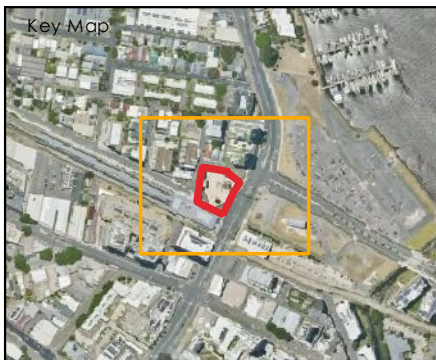
1. Australia Latest Metromap

2. NSW Cadasre

2. NSW Road



Scale at A3: 1:750





5% AEP Flood Velocity Differences

Future Conditions Less Benchmark Conditions

Project: Flood Impact Risk Assessment
10 Dargar Street, Wickham

Client: Urban Property Group

Project Code: 300204409

Drawn By: JL, Checked By: SY

Date: (2026-04-02)

Figure No: **Figure I2**

Legend

 StudyArea

Velocity Difference (m/s)

 < -0.75

 -0.50 to -0.30

 -0.30 to -0.20

 -0.10 to -0.20

 -0.1 to 0.1

 0.1 to 0.2

 0.3 to 0.2

 0.5 to 0.3

 > 0.5

 Cadastre

DRAFT - Not For Construction

Notes:

1. Map displayed in EPSG:28356

References:

1. Australia Latest Metromap

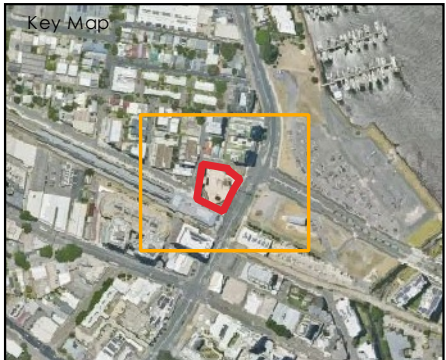
2. NSW Cadasre

2. NSW Road



7 0 7 14 21 28 m

Scale at A3: 1:750





**5% AEP Flood Hazard Differences
Future Conditions Less Benchmark
Conditions**

Project: Flood Impact Risk Assessment
10 Dangar Street, Wickham

Client: Urban Property Group

Project Code: 300204409

Drawn By: JL, Checked By: SY

Date: (2026-04-02)

Figure No: **Figure I3**

Legend

 StudyArea

Hazard Difference

 -5 categories

 -4 categories

 -3 categories

 -2 categories

 -1 categories

 No Change

 +1 categories

 +2 categories

 +3 categories

 +4 categories

 +5 categories

 Cadastre

DRAFT - Not For Construction

Notes:

1. Map displayed in EPSG:28356

References:

1. Australia Latest Metromap

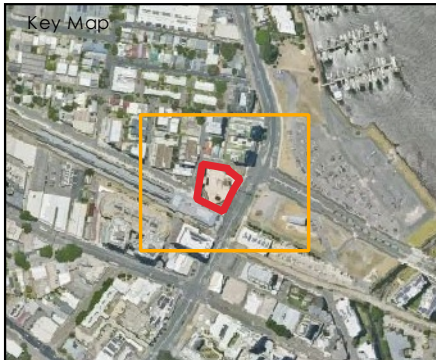
2. NSW Cadasre

2. NSW Road



7 0 7 14 21 28 m

Scale at A3: 1:750





**1%AEP Flood Level Differences
Future Conditions Less Benchmark
Conditions**

Project: Flood Impact Risk Assessment
10 Dargar Street, Wickham

Client: Urban Property Group

Project Code: 300204409

Drawn By: JL, Checked By: SY

Date: (2026-04-02)

Figure No: **Figure I4**

Legend

 StudyArea

Wet/Dry Analysis

 Was Wet, Now Dry

 Was Dry, Now Wet

Water Level Differences (m)

 < -0.50

 -0.50 to -0.30

 -0.30 to -0.10

 -0.10 to -0.05

 -0.05 to -0.01

 -0.01 to 0.01

 0.01 to 0.05

 0.05 to 0.10

 0.10 to 0.30

 0.30 to 0.50

 > 0.50

 Cadastre

DRAFT - Not For Construction

Notes:

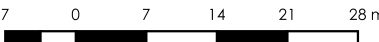
1. Map displayed in EPSG:28356

References:

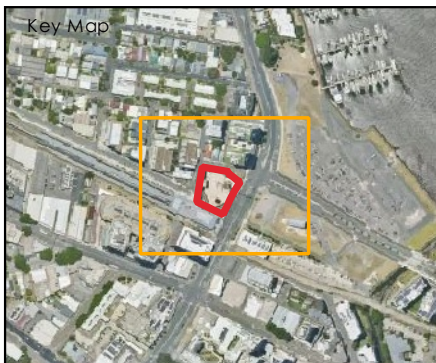
1. Australia Latest Metromap

2. NSW Cadasre

2. NSW Road



Scale at A3: 1:750





1% AEP Flood Velocity Differences

Future Conditions Less Benchmark Conditions

Project: Flood Impact Risk Assessment
10 Dargar Street, Wickham

Client: Urban Property Group
Project Code: 300204409

Drawn By: JL, Checked By: SY

Date: (2026-04-02)

Figure No: **Figure I5**

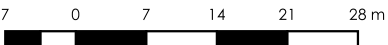
Legend

- StudyArea
- Velocity Difference (m/s)
 - < -0.75
 - 0.50 to -0.30
 - 0.30 to -0.20
 - 0.10 to -0.20
 - 0.1 to 0.1
 - 0.1 to 0.2
 - 0.3 to 0.2
 - 0.5 to 0.3
 - > 0.5
 - Cadastre

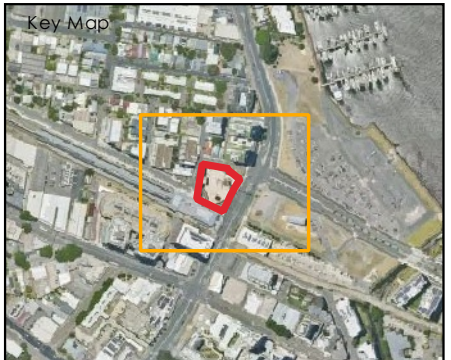
DRAFT - Not For Construction

Notes:
1. Map displayed in EPSG:28356

References:
1. Australia Latest Metromap
2. NSW Cadasre
2. NSW Road



Scale at A3: 1:750





1%AEP Flood Hazard Differences Future Conditions Less Benchmark Conditions

Project: Flood Impact Risk Assessment
10 Dangar Street, Wickham

Client: Urban Property Group

Project Code: 300204409

Drawn By: JL, Checked By: SY

Date: (2026-04-02)

Figure No: **Figure I6**

Legend

 StudyArea

Hazard Difference

 -5 categories

 -4 categories

 -3 categories

 -2 categories

 -1 categories

 No Change

 +1 categories

 +2 categories

 +3 categories

 +4 categories

 +5 categories

 Cadastre

DRAFT - Not For Construction

Notes:

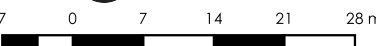
1. Map displayed in EPSG:28356

References:

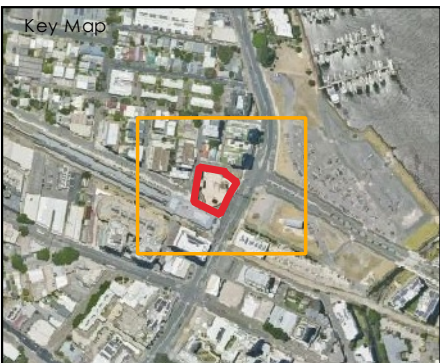
1. Australia Latest Metromap

2. NSW Cadasre

2. NSW Road



Scale at A3: 1:750





1%AEP in 2050 Flood Level Differences Future Conditions Less Benchmark Conditions

Project: Flood Impact Risk Assessment
10 Dargar Street, Wickham

Client: Urban Property Group
Project Code: 300204409

Drawn By: JL, Checked By: SY

Date: (2026-04-02)

Figure No: **Figure I7**

Legend

- StudyArea
- Wet/Dry Analysis
 - Was Wet, Now Dry
 - Was Dry, Now Wet
- Water Level Differences (m)
 - < -0.50
 - 0.50 to -0.30
 - 0.30 to -0.10
 - 0.10 to -0.05
 - 0.05 to -0.01
 - 0.01 to 0.01
 - 0.01 to 0.05
 - 0.05 to 0.10
 - 0.10 to 0.30
 - 0.30 to 0.50
 - > 0.50
 - Cadastre

DRAFT - Not For Construction

Notes:
1. Map displayed in EPSG:28356

References:
1. Australia Latest Metromap
2. NSW Cadasre
2. NSW Road



Scale at A3: 1:750





1% AEP in 2050 Flood Velocity Differences Future Conditions Less Benchmark Conditions

Project: Flood Impact Risk Assessment
10 Dargar Street, Wickham

Client: Urban Property Group

Project Code: 300204409

Drawn By: JL, Checked By: SY

Date: (2026-04-02)

Figure No: **Figure I8**

Legend

StudyArea

Velocity Difference (m/s)

< -0.75

-0.50 to -0.30

-0.30 to -0.20

-0.10 to -0.20

-0.1 to 0.1

0.1 to 0.2

0.3 to 0.2

0.5 to 0.3

> 0.5

Cadastre

DRAFT - Not For Construction

Notes:

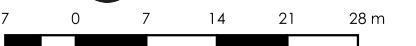
1. Map displayed in EPSG:28356

References:

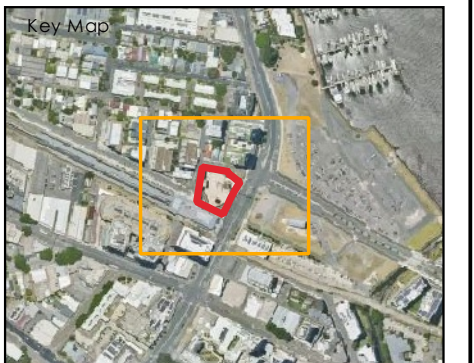
1. Australia Latest Metromap

2. NSW Cadasre

2. NSW Road



Scale at A3: 1:750





1% AEP in 2050 Flood Hazard Differences Future Conditions Less Benchmark Conditions

Project: Flood Impact Risk Assessment
10 Dargar Street, Wickham

Client: Urban Property Group
Project Code: 300204409

Drawn By: JL, Checked By: SY

Date: (2026-04-02)

Figure No: **Figure I9**

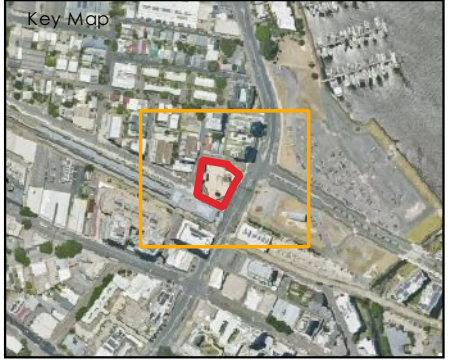
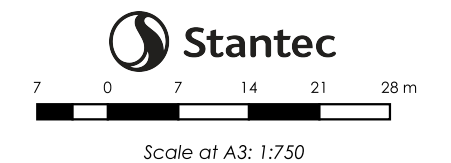
Legend

- StudyArea
- Hazard Difference
 - 5 categories
 - 4 categories
 - 3 categories
 - 2 categories
 - 1 categories
 - No Change
 - +1 categories
 - +2 categories
 - +3 categories
 - +4 categories
 - +5 categories
 - Cadastre

DRAFT - Not For Construction

Notes:
1. Map displayed in EPSG:28356

References:
1. Australia Latest Metromap
2. NSW Cadasre
2. NSW Road





1% AEP in 2100 Flood Level Differences
Future Conditions Less Benchmark Conditions

Project: Flood Impact Risk Assessment
10 Dargar Street, Wickham
Client: Urban Property Group
Project Code: 300204409
Drawn By: JL, Checked By: SY
Date: (2026-04-02)

Figure No: **Figure I10**

Legend

- StudyArea
- Wet/Dry Analysis
 - Was Wet, Now Dry
 - Was Dry, Now Wet
- Water Level Differences (m)
 - < -0.50
 - 0.50 to -0.30
 - 0.30 to -0.10
 - 0.10 to -0.05
 - 0.05 to -0.01
 - 0.01 to 0.01
 - 0.01 to 0.05
 - 0.05 to 0.10
 - 0.10 to 0.30
 - 0.30 to 0.50
 - > 0.50
 - Cadastre

DRAFT - Not For Construction

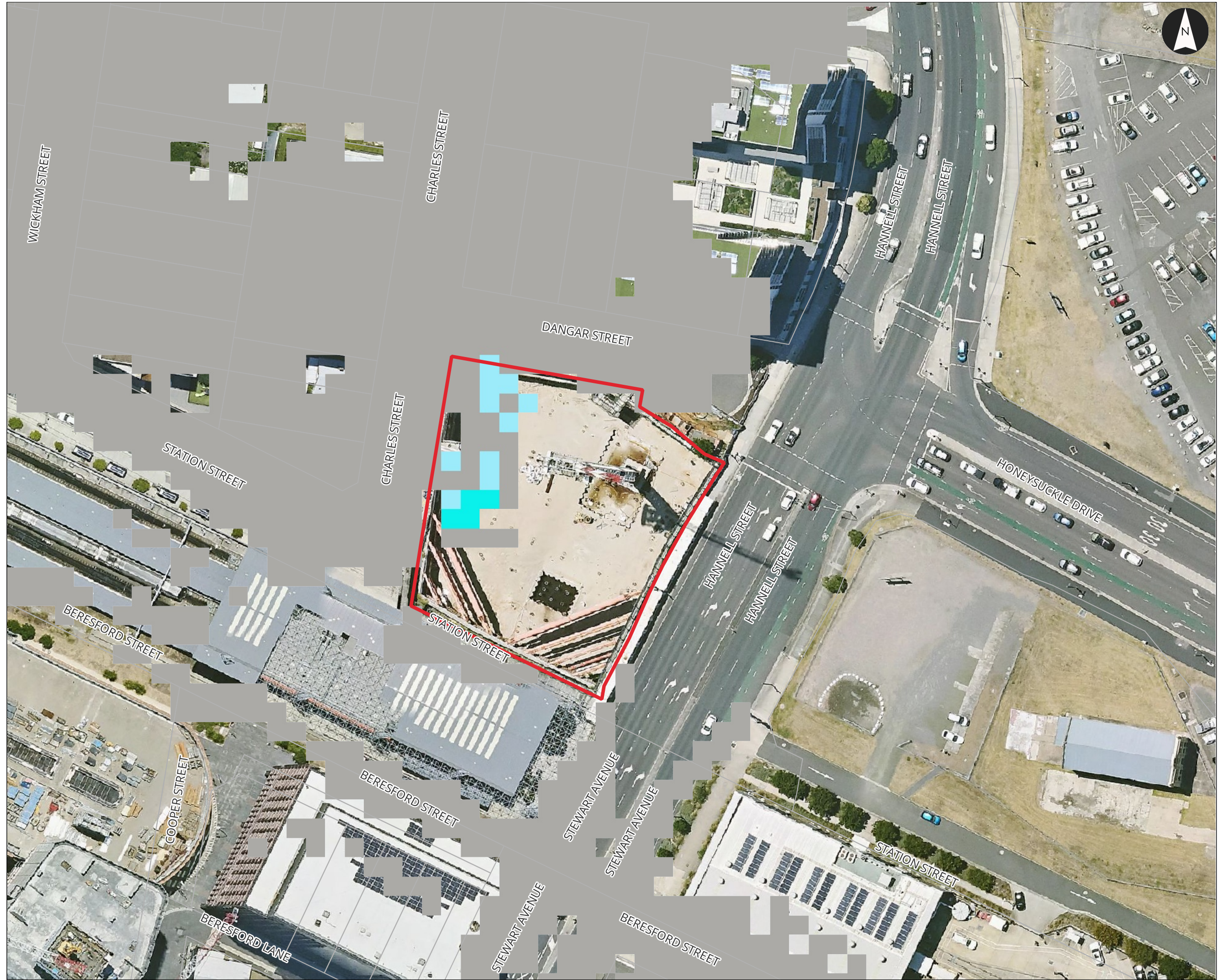
Notes:
1. Map displayed in EPSG:28356

References:
1. Australia Latest Metromap
2. NSW Cadasre
2. NSW Road



Scale at A3: 1:750





1%AEP in 2100 Flood Velocity Differences
Future Conditions Less Benchmark Conditions

Project: Flood Impact Risk Assessment
10 Dargar Street, Wickham

Client: Urban Property Group
Project Code: 300204409

Drawn By: JL, Checked By: SY

Date: (2026-04-02)

Figure No: **Figure I11**

Legend

StudyArea

Velocity Difference (m/s)

	< -0.75
	-0.50 to -0.30
	-0.30 to -0.20
	-0.10 to -0.20
	-0.1 to 0.1
	0.1 to 0.2
	0.3 to 0.2
	0.5 to 0.3
	> 0.5
	Cadastre

DRAFT - Not For Construction

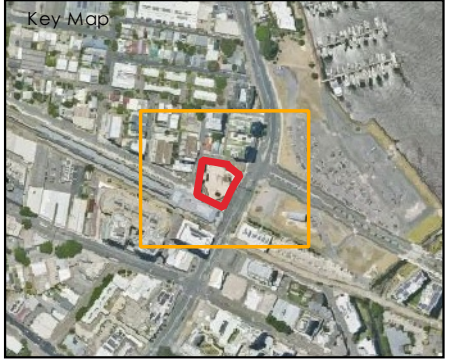
Notes:
1. Map displayed in EPSG:28356

References:
1. Australia Latest Metromap
2. NSW Cadasre
2. NSW Road

 **Stantec**

7 0 7 14 21 28 m

Scale at A3: 1:750





1%AEP in 2100 Flood Hazard Differences Future Conditions Less Benchmark Conditions

Project: Flood Impact Risk Assessment
10 Dangar Street, Wickham

Client: Urban Property Group
Project Code: 300204409

Drawn By: JL, Checked By: SY

Date: (2026-04-02)

Figure No: **Figure I12**

- Legend**
- StudyArea
 - Hazard Difference
 - 5 categories
 - 4 categories
 - 3 categories
 - 2 categories
 - 1 categories
 - No Change
 - +1 categories
 - +2 categories
 - +3 categories
 - +4 categories
 - +5 categories
 - Cadastre

DRAFT - Not For Construction

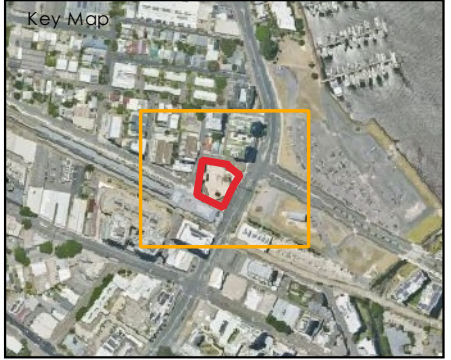
Notes:
1. Map displayed in EPSG:28356

References:
1. Australia Latest Metromap
2. NSW Cadasre
2. NSW Road

Stantec

7 0 7 14 21 28 m

Scale at A3: 1:750





**PMF Flood Level Differences
Future Conditions Less Benchmark
Conditions**

Project: Flood Impact Risk Assessment
10 Dangar Street, Wickham

Client: Urban Property Group

Project Code: 300204409

Drawn By: JL, Checked By: SY

Date: (2026-04-02)

Figure No: **Figure I13**

Legend

StudyArea

Wet/Dry Analysis

Was Wet, Now Dry

Was Dry, Now Wet

Water Level Differences (m)

< -0.50

-0.50 to -0.30

-0.30 to -0.10

-0.10 to -0.05

-0.05 to -0.02

-0.02 to 0.02

0.02 to 0.05

0.05 to 0.10

0.10 to 0.30

0.30 to 0.50

> 0.50

Cadastre

DRAFT - Not For Construction

Notes:

1. Map displayed in EPSG:28356

References:

1. Australia Latest Metromap

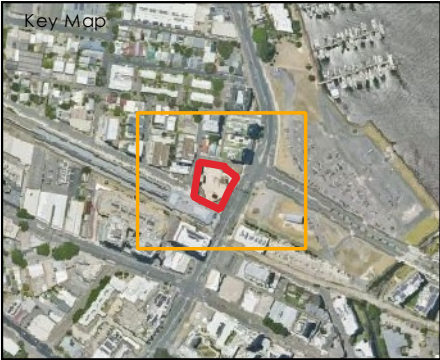
2. NSW Cadasre

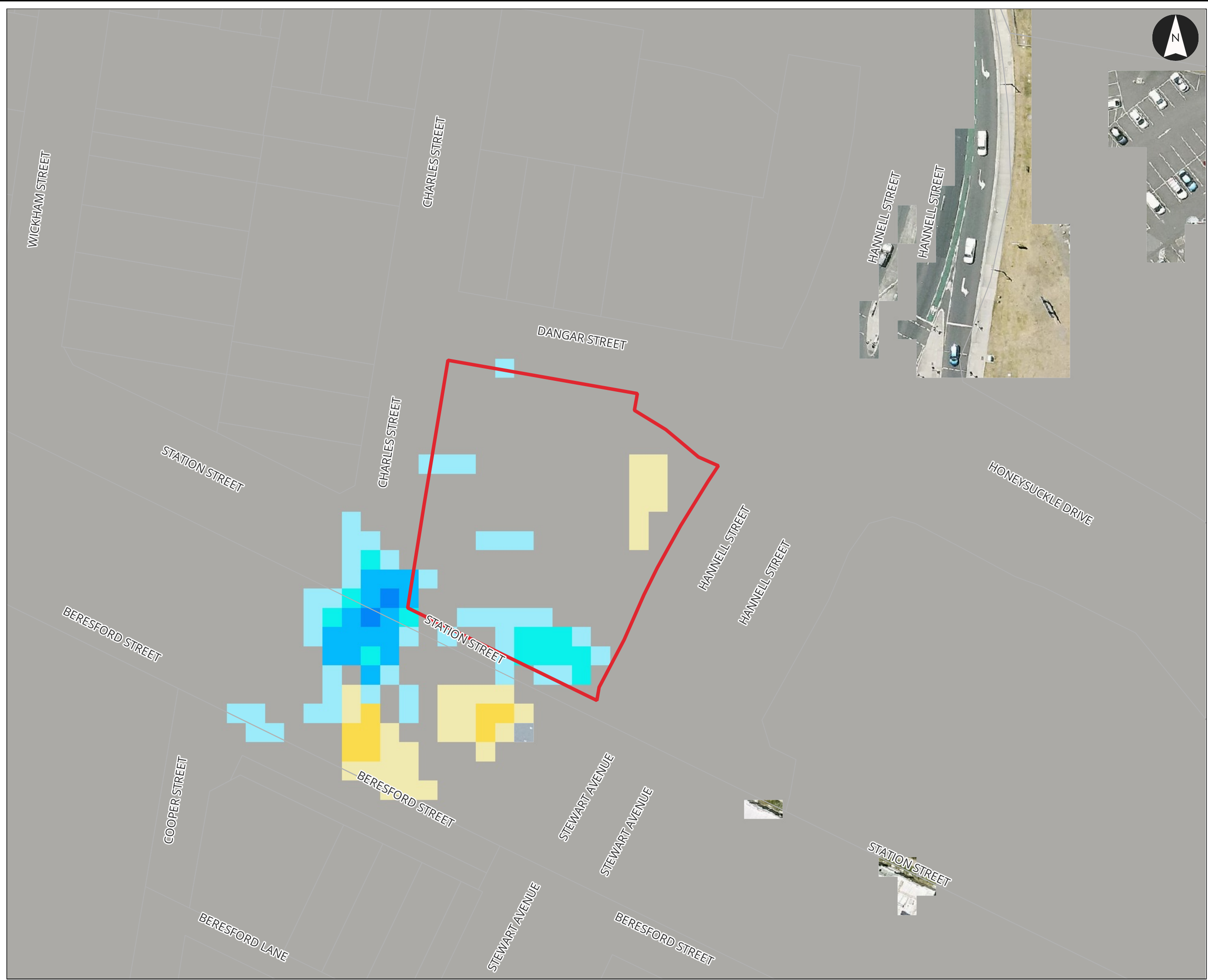
2. NSW Road



7 0 7 14 21 28 m

Scale at A3: 1:750





PMF Flood Velocity Differences Future Conditions Less Benchmark Conditions

Project: Flood Impact Risk Assessment
10 Dargar Street, Wickham
Client: Urban Property Group
Project Code: 300204409
Drawn By: JL, Checked By: SY
Date: (2026-04-02)

Figure No: **Figure I14**

Legend

- StudyArea
- Velocity Difference (m/s)
 - < -0.75
 - 0.50 to -0.30
 - 0.30 to -0.20
 - 0.10 to -0.20
 - 0.1 to 0.1
 - 0.1 to 0.2
 - 0.3 to 0.2
 - 0.5 to 0.3
 - > 0.5
 - Cadastre

DRAFT - Not For Construction

Notes:
1. Map displayed in EPSG:28356

References:
1. Australia Latest Metromap
2. NSW Cadasre
2. NSW Road



Scale at A3: 1:750





**PMF Flood Hazard Differences
Future Conditions Less Benchmark
Conditions**

Project: Flood Impact Risk Assessment
10 Dangar Street, Wickham

Client: Urban Property Group

Project Code: 300204409

Drawn By: JL, Checked By: SY

Date: (2026-04-02)

Figure No: **Figure I15**

Legend

 StudyArea

Hazard Difference

 -5 categories

 -4 categories

 -3 categories

 -2 categories

 -1 categories

 No Change

 +1 categories

 +2 categories

 +3 categories

 +4 categories

 +5 categories

 Cadastre

DRAFT - Not For Construction

Notes:

1. Map displayed in EPSG:28356

References:

1. Australia Latest Metromap

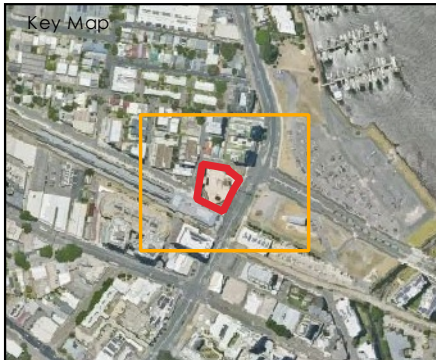
2. NSW Cadasre

2. NSW Road



7 0 7 14 21 28 m

Scale at A3: 1:750



Appendix D Flood Certificate



Additional information for the holders of Flood Information Certificates

This information explains the terms used in City of Newcastle's (CN) Flood Information Certificates and provides some basic information on CN's requirements for future development of flood prone land.

Compliance with these requirements in the Development Control Plan does not guarantee approval, however, in most cases, the flood issues can be resolved by adhering to these guidelines.

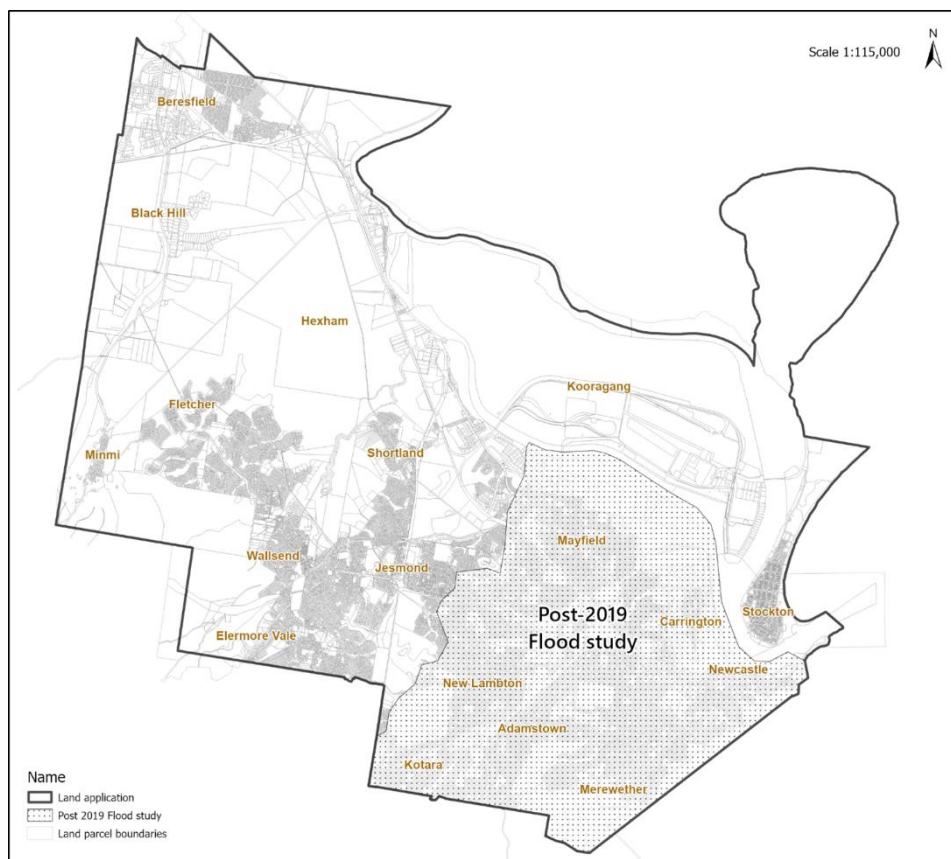
The following information applies to local catchment (flash) flooding only. This is expected to be the critical flood for most areas studied in the 2023 Throsby, Styx and Cottage Creek flood study. For information relating to ocean and riverine flooding please refer to Section B1(a) of the Newcastle Development Control Plan 2023.

FOR PROPERTIES IN THE THROSBY, STYX AND COTTAGE CREEK CATCHMENTS

FLOOD CERTIFICATE NOTES

GENERAL:

- The information presented in this Flood Information Certificate ("the Certificate") relates to the Newcastle City-wide Floodplain Risk Management Plan and the Newcastle Development Control Plan, which have been developed in accordance with the principles of the NSW Government's Flood Prone Land Policy.
- CN's flood information is compiled from a composite of data. The variability of rainfall itself is a major factor in the uncertainty of flood information and accordingly, this certificate is only an estimate of real flood characteristics. Any particular flood is likely to be different to the conditions described in this certificate.
- CN acknowledges that its flood information is incomplete and varies in accuracy, however it is the best available to CN at the time of issue.
- Where information is presently not known, it is denoted by "unknown".
- From time to time, on-going research and studies will replace or add to CN's flood information. Accordingly, the information in the Certificate is not warranted after the day of issue.
- Should you disagree with CN's assessment of the flood behaviour, you may conduct your own investigations or enquiries and submit them to CN for consideration. Where revision of this assessment is warranted, CN is committed to making such amendments to its information.
- This document applies to properties within the Post-2019 Flood Study area (see below).



FOR PROPERTIES IN THE THROSBY, STYX AND COTTAGE CREEK CATCHMENTS



EXPLANATIONS FOR TERMS USED IN THE FLOOD INFORMATION CERTIFICATE

Is any part of the site affected by a Floodway?

Generally, where a property is affected by a floodway, we will provide you with additional information on where we believe the floodway to be by way of a map. In rare circumstances it may be possible to redirect a floodway subject to appropriate engineering advice. You should start by discussing the matter with a Development Officer from CN.

A **Floodway** is a pathway taken by major discharges of floodwaters, the obstruction or partial obstruction of which would cause a significant redistribution of floodwaters, or a significant increase in flood levels. Floodways are often aligned with existing or historic natural channels or watercourses but can form elsewhere in the floodplain.

Section B1(b) of Newcastle DCP 2023 states:

"No building or structure can be built, and no land can be filled with any materials in areas identified as floodways, except for small changes to ground levels that do not significantly change the flow patterns for:

- a) roads*
- b) parking*
- c) below ground structures*
- d) landscaping.*

Where dividing fences across floodways are unavoidable, they are constructed only of open type fencing that does not restrict the flow of flood waters and are resistant to blockage. New development is designed to avoid fences in floodways."

Is any part of the site affected by a Flood Storage Area?

Where a property is wholly affected by a Flood Storage Area, we will answer "yes" to this question on the Certificate. Where a property is partly affected, we will provide additional information by way of a map.

Flood Storage Area is an area where flood water accumulates and the displacement of that floodwater will cause a significant redistribution of floodwaters, or a significant increase in flood levels, or a significant increase in downstream flood frequency. Flood storage areas are often aligned with floodplains and are usually characterised by deep and slow-moving floodwater.

Section B1(b) of Newcastle DCP 2023 states:

"Not more than 20% of the area of any development site in a flood storage area is filled. The remaining 80% is generally developed allowing for underfloor storage of floodwater by the use of suspended floor techniques such as pier and beam construction.

Where a development is proposing to build over more than 20% of the site area, the portion of the structure being suspended is to have a floor level at the FPL as a minimum. As part of the structure's design, it must allow water to flow freely into and out of the underfloor area and must not be restricted by solid cladding or similar around the perimeter of the structure below the floor level."*

* FPL is the Flood Planning Level which is explained further below.

FOR PROPERTIES IN THE THROSBY, STYX AND COTTAGE CREEK CATCHMENTS



1% Annual Exceedance Probability (AEP) event level:

The 1% AEP event is a flood event that has a 1 in 100 chance of being exceeded in any one year. Conceptually, it is similar to a "1 in 100 year" event, except that the term "1 in 100 years" conveys the notion that the event is definitely going to happen in a 100-year time frame, and will only occur once in that time frame. In fact, a "1 in 100 year" event has a 67% probability of occurring once in any nominate hundred-year period.

1% AEP in 2050 event level:

The 1% AEP in 2050 event is a modelled flood event in the Throsby, Styx and Cottage Creek Flood Study (Rhelm 2023) simulating a 1% AEP event as it would occur in 2050 within a RCP8.5 climate scenario. The model uses a 0.5% AEP rainfall event as a proxy for rainfall intensification due to climate change and a 0.4 metre sea level rise.

In 2023, CN adopted the 1% Annual Exceedance Probability event in 2050 as the Defined Flood Event for flood planning purposes to improve community resilience to climate change impacts. The Defined Flood Event is the flood event selected as the general standard for the management of flooding to development.

Levels are reduced to the Australian Height Datum. This means that the quoted levels are heights above sea level. They can be compared to ground levels determined by a surveyor using the same datum to ascertain the likely flood depth.

In general, the minimum requirement for development of flood prone land is to set floor levels of all occupiable rooms of all buildings not lower than above the **Flood Planning Level (FPL)**. The Flood Planning Level is the peak flood level for the Defined Flood Event **plus** the appropriate freeboard (usually, but not always 500mm, depending on the circumstances) to account for uncertainty, wave action, and model error.

Section B1(b) of Newcastle DCP 2023 states:

"Floor levels of all occupiable rooms of all buildings are not set lower than the FPL."

"Garage floor levels are no lower than the 1% 2050 AEP event. However, it is recognised that in some circumstances this may be impractical due to vehicular access constraints. In these cases, garage floor levels are as high as practicable."

"Basement garages may be acceptable where all potential water entry points are at or above the probable maximum flood (PMF), excepting that vehicular entry points can be at the FPL. In these cases, explicit points of refuge are accessible from the carpark in accordance with the controls for risk to life set out below."

"Electrical fixtures such as power points, light fittings and switches are sited above the FPL unless they are on a separate circuit (with earth leakage protection) to the rest of the building."

"Swimming pools are to be located to ensure they are not inundated from minor flooding events. Electrical connections and fixtures around swimming pools are to be sited at the FPL."

"Where parts of the building are proposed below the FPL, they are constructed of water-resistant materials."

FOR PROPERTIES IN THE THROSBY, STYX AND COTTAGE CREEK CATCHMENTS

Flood Hazard Thresholds

Flood Hazard Thresholds provide generalised qualitative measures of the relative vulnerability of people, vehicles, and buildings based on the velocity and depth of floodwaters. These thresholds and their effects on people and property are derived from research (Smith, Davey & Cox 2014*) and have been adopted for use in Department of Planning and Environment's *Flood risk management manual* and Geoscience Australia's *Australian Rainfall and Runoff 2019*.

These Flood Hazard Thresholds are used in NDCP 2023 to apply appropriate development controls to manage flood risks arising from development in flood affected areas.

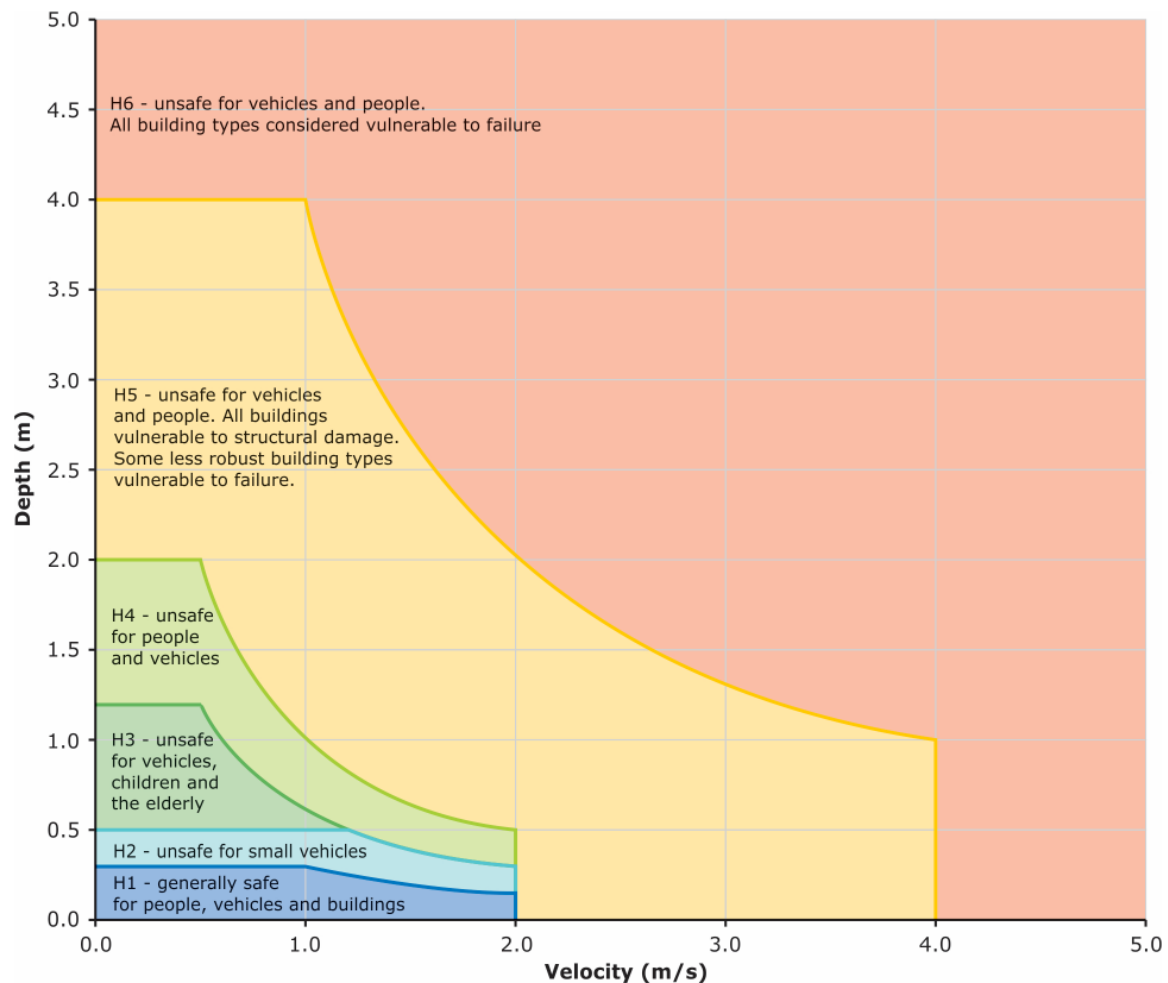


Figure 1 - Flood Hazard Thresholds and their descriptive effects on the stability of people and property (Smith, Davey & Cox 2014*)

*Smith, G.P., Davey, E.K. & Cox R.J. 2014, *Flood Hazard*, WRL Technical Report 2014/07, UNSW Water Research Laboratory, Sydney

Highest Property Risk Category:

Property risks describe the danger that flood waters might pose to the property of persons affected by flooding. Generally, the descriptions are:

- P1** Parked or moving cars remain stable
- P2** Unsafe for small vehicles

FOR PROPERTIES IN THE THROSBY, STYX AND COTTAGE CREEK CATCHMENTS

- P3** Suitable for light construction (e.g. timber frame, masonry and brick veneer). Unsafe for vehicles, children and the elderly.
- P4** Suitable for light construction (e.g. timber frame, masonry and brick veneer). Unsafe for vehicles and people.
- P5** Unsafe for vehicles and people. All buildings vulnerable to structural damage. Some less robust building types vulnerable to failure.
- P6** Unsafe for vehicles and people. All building types considered vulnerable to failure.

They are determined by direct correlation to the Flood Hazard Threshold (P1 relates to a Flood Hazard Threshold of H1) as determined at the Defined Flood Event, usually the 1% AEP in 2050 flood. The Flood Hazard Thresholds used in the determination of these risks are shown in Figure 1 below.

For the purposes of the flood information quoted here, the property hazard relates to the ground level as understood by CN at the time the information was collected. The property risk cannot be used to determine the ground level of the site.

Property risks can be reduced by filling a site, or raising floor levels as appropriate provided that the work is compatible with the applicable (if any) floodway or flood storage area.

In general, the minimum requirement for managing property risk is to set floor levels to the Flood Planning Level (usually expressed as a reduced level above the Australian Height Datum, or AHD).

The Newcastle DCP 2023 states:

"Areas where cars, vans and trailers are parked, displayed or stored are only located in areas subject to property risk of P1. Containers, bins, hoppers and other large floatable objects are not to be stored in these areas. Heavy vehicle parking areas can only be located in locations subject to P1 or P2 categories."

"Timber framed, light steel construction, cavity brickwork and other conventional domestic building materials are generally suitable forms of construction where the property risk is P1 to P4."

"Property risk of P5 is generally unsuitable for building construction and building is discouraged from these areas. Where building is necessary, the structure is certified by a practising structural engineer to withstand the hydraulic loads (including debris) induced by the flood waters."

"Property risk of P6 is unsuitable for any type of building construction."

Highest Life Risk Category:

Life risks describe the danger that flood waters might pose to the lives of persons affected by flooding. Generally, the descriptions are:

- L1** Flood event (typically ocean and riverine flooding) too long for a refuge enclosed by floodwaters to be appropriate. Refuge must be sought outside of the entire flood via formal community evacuation plans. Sufficient warning is generally available for such events.
- L2** Generally safe for people.
- L3** Unsafe for children and the elderly. On-site refuge is to be provided in development other than commercial premises or industry.
- L4** Unsafe for all people. On-site refuge is required.

FOR PROPERTIES IN THE THROSBY, STYX AND COTTAGE CREEK CATCHMENTS

L5 Unsafe for all people. On-site refuge is required. All buildings vulnerable to structural damage. Some less robust building types vulnerable to failure.

L6 Unsafe for all people. All building types considered vulnerable to failure.

Life risks are determined by considering the Flood Hazard Threshold (see below) at the Probable Maximum Flood (PMF).

		Flood Hazard Threshold					
		H1	H2	H3	H4	H5	H6
Catchment Response time	Riverine and Ocean	L1					
	Flash	L2	L3	L4	L5	L6	

Figure 2 - Life Risk determination

The Newcastle DCP 2023 states:

"On-site refuge is to be provided for all development where the risk to life category is L3 or higher unless:

- the proposed development is less than 40m from the perimeter of the PMF extent and the higher ground is accessible, or*
- the proposed use is defined as commercial premises or industry in which case onsite refuge is only required where the risk category is L4 or higher."*

"Where on-site refuge is required for a development, it should comply with the following minimum standards:

- The minimum on-site refuge is the level of the PMF. On-site refuges are designed to cater for the number of people reasonably expected on the development site and are provided with emergency lighting.*
- On-site refuges are of a construction type able to withstand the effects of flooding. Design certification by a practising structural engineer that the building is able to withstand the hydraulic loading due to flooding (at the PMF)."*

The requirement for on-site refuge (where applicable) will generally be satisfied by a two-storey building form. However, for residential properties, attic access stairs and suitable small platform will usually also suffice.

In most cases where on site refuge is required, the duration of the peak flood event is short and accordingly, it is not expected to have to utilise flood refuge areas for long periods of time, especially when the chance of them being used is generally less than 1% in any given year. Accordingly, comfort factors are not of large concern to owners, occupiers or CN in determining the suitability of flood refuges.

FLOOD INFORMATION CERTIFICATE



21 August 2025

Upg Wickahm Pty Ltd
C/- Urban Property Group
Suite 110 Level 1 180-186 Burwood Road
Burwood NSW 2134

Dear Upg Wickahm Pty Ltd

Flood Information Certificate No: FL2025/00243

Land: Lot 1 DP 1197377

Property Address: 10 Dangar Street Wickham NSW 2293

Thank you for your recent enquiry regarding flood behaviour at the above property. This letter confirms the property is located in a flood prone area.

The pertinent features of the flood behaviour are estimated as follows:

Ocean Flooding

Is any part of the site affected by a floodway?	No
Is any part of the site affected by a flood storage area?	No
Estimated 1% Annual Exceedance Probability event level: (equivalent to the " <i>Defined Flood Level</i> " in the Building Code of Australia)	2.20m AHD
Estimated Maximum Flow Velocity of floodwaters (in the " <i>Defined Flood Event</i> " as per the Building Code of Australia)	0.15m/s
Highest Property Risk Category*	P3
Estimated Probable Maximum Flood Level	3.40m AHD (0.15m/s)
Highest Life Risk Category*	L1 (H4)

**Based on flood hazard and risk categories in the 2012 Newcastle City-wide Floodplain Risk Management Study (BMT WBM 2012). Refer to Section B1(a) of Newcastle Development Control Plan 2023.*

Local Catchment Flooding

Is any part of the site affected by a floodway?	No
Is any part of the site affected by a flood storage area?	Yes
Estimated 1% Annual Exceedance Probability event level: (equivalent to the “ <i>Defined Flood Level</i> ” in the Building Code of Australia)	2.30m AHD
Estimated Maximum Flow Velocity of floodwaters (in the “ <i>Defined Flood Event</i> ” as per the Building Code of Australia)	0.05m/s
Highest Property Risk Category**	P3
Estimated Probable Maximum Flood Level	3.30m AHD (maximum flow velocity of 1.20m/s)
Highest Life Risk Category**	L4 (H4)

**Based on flood hazard and risk categories in the Throsby, Styx and Cottage Creek Flood Study (Rhelm 2023). Refer to Section B1(b) of Newcastle Development Control Plan 2023.

The flood study from which ocean flooding information is derived is part of a Newcastle City Wide Floodplain Management Plan, while local catchment flooding information is derived from a Throsby, Styx & Cottage Creek Flood Study completed by Rhelm in 2023. The above advice may change in the future, however the advice is based on the best information held by Council at the time of issue of this certificate.

The above ocean flood level estimates include a sea level rise relative to 1990 mean sea levels of 90cm by 2100, as used in the Newcastle City-wide Floodplain Risk Management Study and Plan (June 2012).

The Newcastle Development Control Plan 2023 addresses the issues of flood management for new development. You can view the Development Control Plan at www.newcastle.nsw.gov.au. In summary, the following requirements apply for all future development applications on the site.

Development in a floodway is not generally allowable due to likely redistribution of flood water.	Not Applicable
Filling of a flood storage area by more than 20% is not generally allowable due to redistribution of flood water.	Applicable (Part site - see figure below)
Minimum floor level for occupiable rooms in a new development on this site is: (equivalent to the “ <i>Flood Hazard Level</i> ” in the Building Code of Australia)	2.80m AHD
Is onsite flood refuge required?	Yes

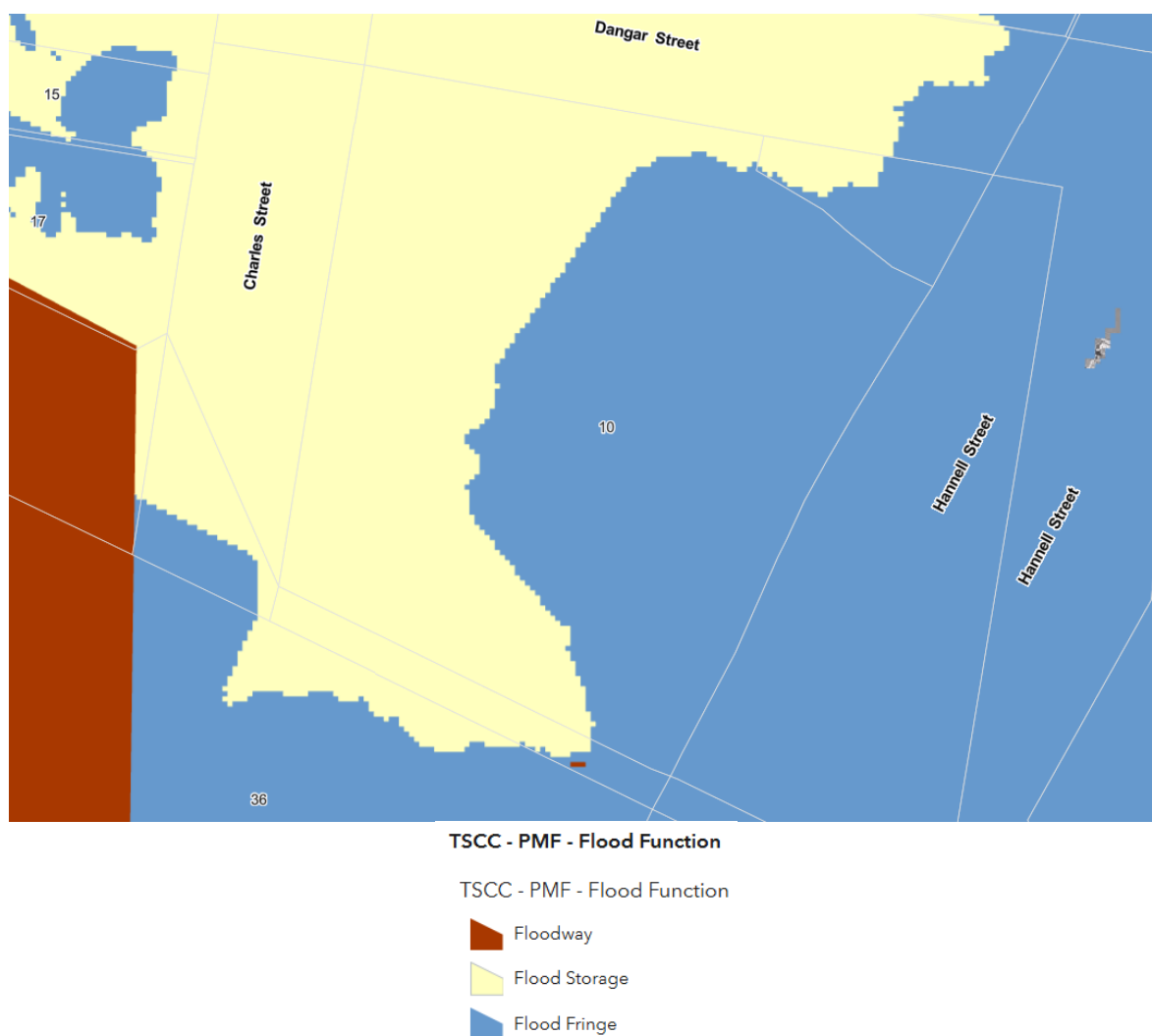


Figure 1 Flood function across the site.

The Newcastle Local Environmental Plan 2012 includes provisions that apply to development within flood prone areas. You can view the Local Environmental Plan at www.newcastle.nsw.gov.au. In summary, the following provisions apply for all future development applications on the site.

Is clause 5.21 <i>Flood Planning</i> applicable to a development on this site?	Applicable
Is clause 5.22(2)(a) <i>Special Flood Considerations</i> applicable to a development on this site?	Applicable
Is clause 5.22(2)(b) <i>Special Flood Considerations</i> applicable to a development on this site?	Applicable

Council holds no information concerning floor levels of existing structures on the site. Site levels and floor levels should be verified by survey based on the Australian Height Datum.

Please note that:

1. No assessment of the lot's suitability for the purposes of making an application for a complying development certificate under the Housing Code or Rural Housing Code of *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008*, or for a Secondary Dwelling under *State Environmental Planning Policy (Affordable Rental Housing) 2009*, has been made. This type of flood information can also be obtained from Council via a Flood Information Application. There are two

services provided by Council relating to Complying Development flood criteria, as follows:

- a) Identification of lots affected by any of the flood control lot exclusions identified in subclause 3.5(1) or 3A.38(1) of *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008*. If this information is required, select Box 4. b) (i) on the Flood Information Application form and pay the required fee.
 - b) An assessment of a proposal for development of the lot for compliance with the requirements of subclause 3.36(2) or 3A.38(2) of *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008*. If this information is required, select Box 4. b) (ii) on the Flood Information Application form, submit plans and other relevant documentation for the proposal and pay the required fee.
2. The information contained in this certificate may alter in the future. The applicant should at all times ensure the currency of this information.

Should you require any further clarification please contact Zenden Grieves on 4974 2000 or at zgrieves@ncc.nsw.gov.au.

Yours faithfully

Zenden Grieves
DEVELOPMENT OFFICER

Appendix E Selected Architectural Plans





INDICATIVE LINE SHOWING THE OUTSIDE FACE OF THE AS BUILT + SURVEYED PILING, BASED OFF PREVIOUS ADVICE

250MM WALL + 50MM TOLERANCE FROM THE INSIDE FACE OF THE AS BUILT + SURVEYED PILING, BASED OFF PREVIOUS ADVICE

GENERAL NOTES:

- Number of accessible and shared spaces awaiting access and traffic advice.
- Overall parking numbers TBC.
- Basement structure location based on surveyed information.

PARKING SCHEDULE	
Type	Count
CAR SHARE	
STANDARD 5400x2400	2
HOTEL STAFF	
ACCESSIBLE 5400x2400	1
STANDARD 5400x2400	9
RESIDENTIAL	
SMALL 5000x2300	18
STANDARD 5400x2400	179
RETAIL STAFF	
ACCESSIBLE 5400x2400	1
STANDARD 5400x2400	6
Grand total	215

NOT FOR CONSTRUCTION



GENERAL NOTES:

- Number of accessible and shared spaces awaiting access and traffic advice.
- Overall parking numbers TBC
- Basement structure location based on surveyed information

PARKING SCHEDULE	
Type	Count
CAR SHARE	
STANDARD 5400x2400	2
HOTEL STAFF	
ACCESSIBLE 5400x2400	1
STANDARD 5400x2400	9
RESIDENTIAL	
SMALL 5000x2300	18
STANDARD 5400x2400	179
RETAIL STAFF	
ACCESSIBLE 5400x2400	1
STANDARD 5400x2400	5
Grand total	215

NOT FOR CONSTRUCTION

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PRELIMINARY

Nominated Architects: Adam Haddow 7188 | John Pradek 7084

Rev	Date	Revision	By	Chk
A	27/03/2026	ISSUED FOR BIDA		

NOTE: MINOR CHANGES TO FORM AND CONFIGURATION MAY BE REQUIRED WHEN DRAWINGS ARE SUBSEQUENTLY PREPARED FOR CONSTRUCTION PURPOSES AFTER THE GRANT OF DEVELOPMENT CONSENT.

Client
URBAN
PROPERTY

Project
UPG NEWCASTLE
10 DANGAR STREET, WICKHAM

Drawing Name
FLOOR PLAN - BASEMENT 02

Date
27.03.2026

Scale
1 : 100

Sheet Size
A0

Drawn
CN

Chk.
WG

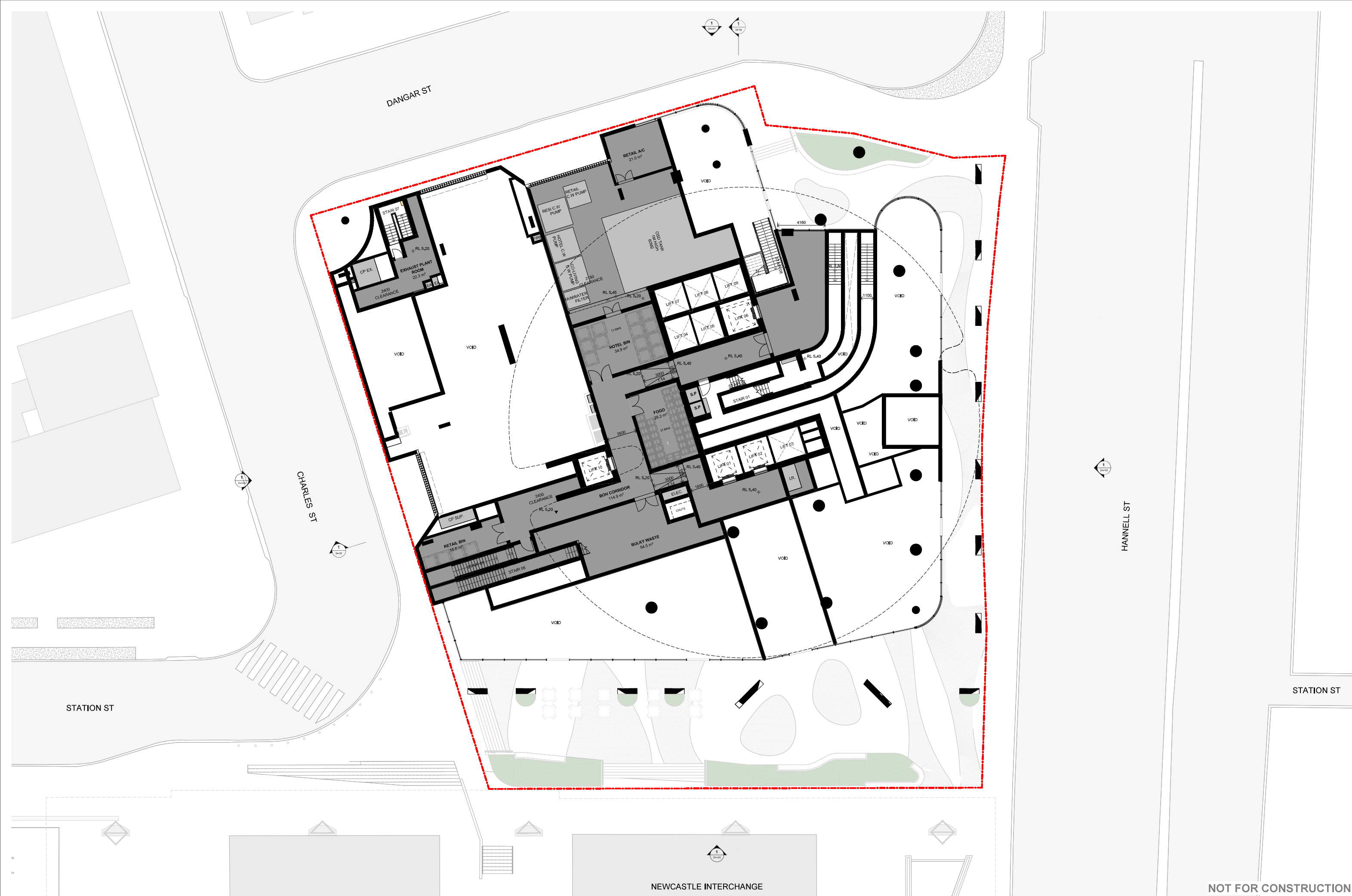
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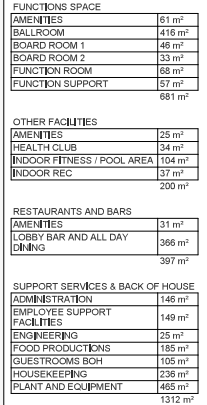
Drawing No.
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Revision
/ A

SJB Architects
Level 2, 492 Crown Street
Sydney NSW 2010
T 61 2 9380 9911
www.sjb.com.au



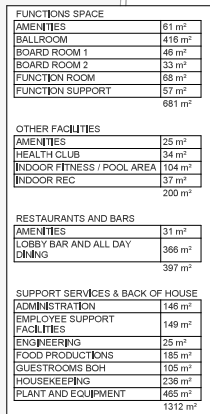






HOTEL TYPES LEGEND		
	ACCESSIBLE	
	02	2
	03	2
	04	2
	05	8
	DOUBLE	
	02	5
	03	5
	04	9
	05	24
	EXECUTIVE SUITE	
	05	3
		3
	JUNIOR SUITE	
	01	2
	02	2
	03	2
	04	8
	KING	
	01	18
	02	24
	03	24
	04	24
	PREMIUM	
	01	3
	02	5
	03	5
	04	5
	05	6
	Grand total	171

FUNCTIONS SPACE	
AMENITIES	61 m²
BALLROOM	416 m²
BOARD ROOM 1	46 m²
BOARD ROOM 2	33 m²
FUNCTION ROOM	68 m²
FUNCTION SUPPORT	57 m²
	681 m²
OTHER FACILITIES	
AMENITIES	25 m²
HEALTH CLUB	34 m²
INDOOR FITNESS / POOL AREA	104 m²
INDOOR REC	37 m²
	200 m²
RESTAURANTS AND BARS	
AMENITIES	31 m²
LOBBY BAR AND ALL DAY DINING	366 m²
	397 m²
SUPPORT SERVICES & BACK OF HOUSE	
ADMINISTRATION	146 m²
EMPLOYEE SUPPORT FACILITIES	149 m²
ENGINEERING	25 m²
FOOD PRODUCTIONS	185 m²
GUESTROOMS BOH	105 m²
HOUSEKEEPING	236 m²
PLANT AND EQUIPMENT	465 m²
	1312 m²





HOTEL TYPES LEGEND		
	ACCESSIBLE	
	02	2
	03	2
	04	2
	05	8
	DOUBLE	
	02	5
	03	6
	04	5
	05	9
	EXECUTIVE SUITE	
	05	3
	JUNIOR SUITE	
	01	2
	02	2
	03	2
	04	2
	KING	
	01	18
	02	24
	03	24
	04	24
	PREMIUM	
	01	3
	02	5
	03	5
	04	5
	05	6
	Grand total	171

FUNCTIONS SPACE	
AMENITIES	61 m ²
BALLROOM	416 m ²
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AMENITIES	25 m ²
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INDOOR FITNESS / POOL AREA	104 m ²
INDOOR REC	37 m ²
	200 m ²

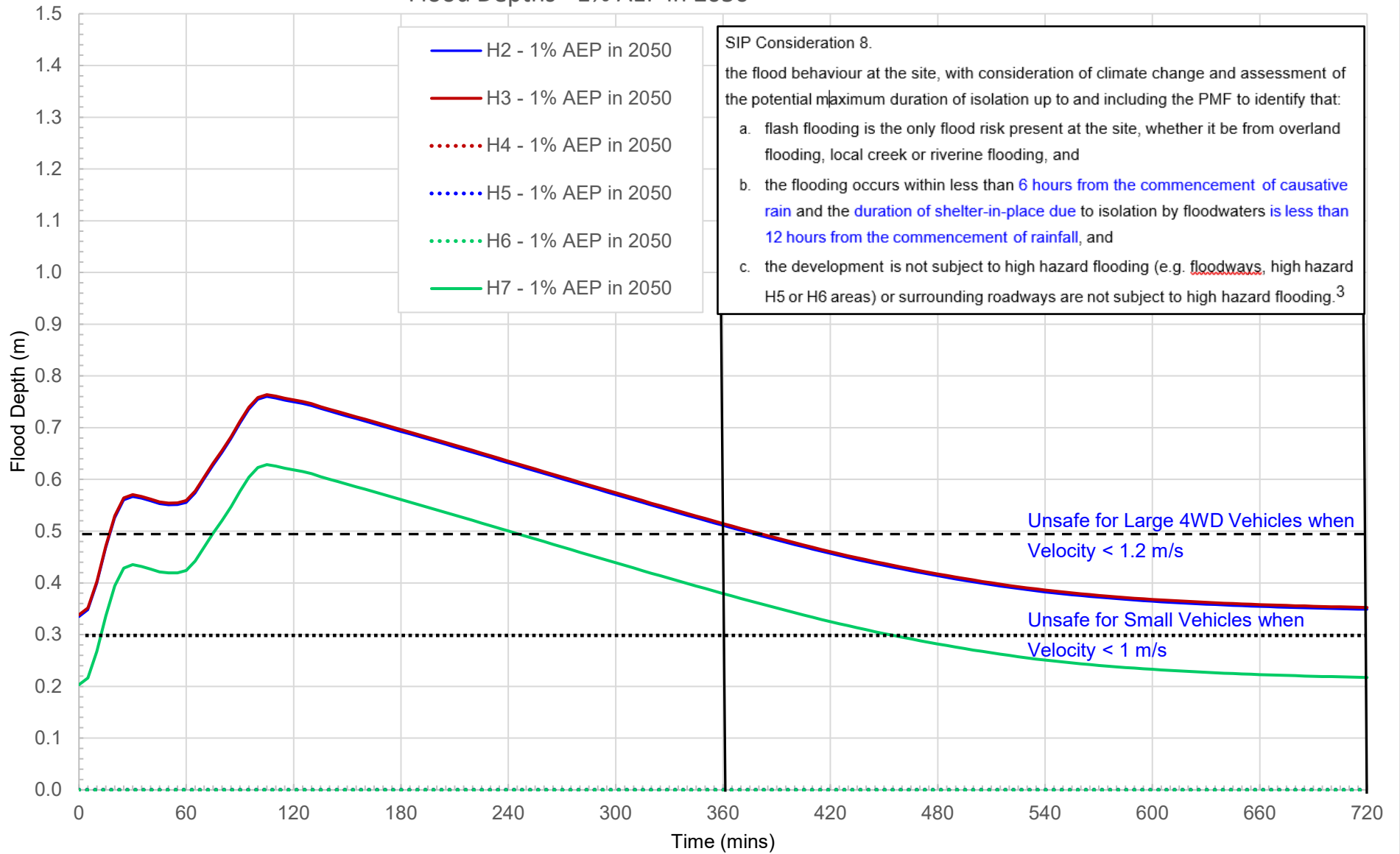
RESTAURANTS AND BARS	
AMENITIES	31 m ²
LOBBY BAR AND ALL DAY DINING	366 m ²
	397 m ²

SUPPORT SERVICES & BACK OF HOUSE	
ADMINISTRATION	146 m ²
EMPLOYEE SUPPORT FACILITIES	149 m ²
ENGINEERING	25 m ²
FOOD PRODUCTIONS	185 m ²
GUESTROOMS BOH	105 m ²
HOUSEKEEPING	236 m ²
PLANT AND EQUIPMENT	465 m ²
	1312 m ²

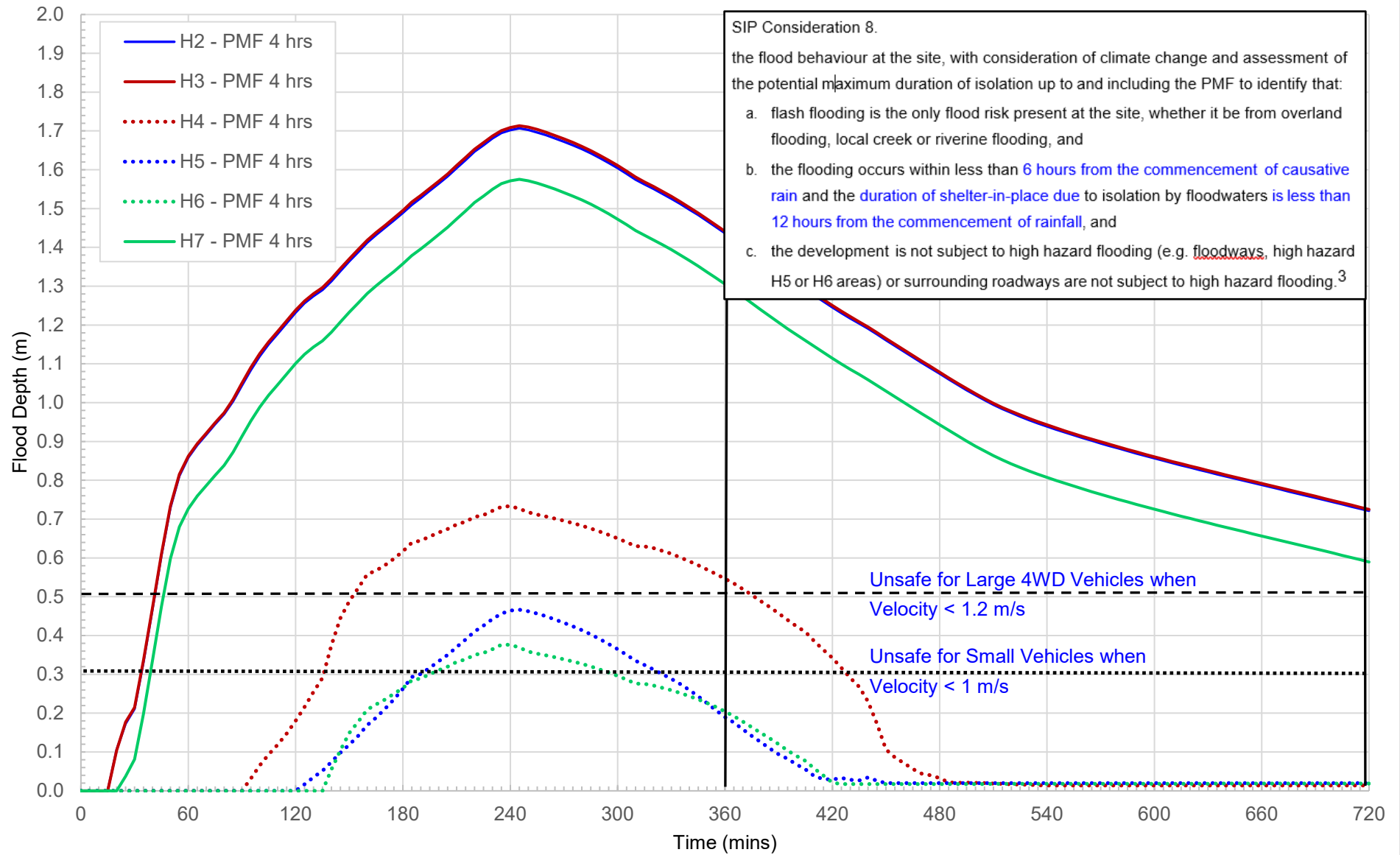
Appendix F Time Series Plots



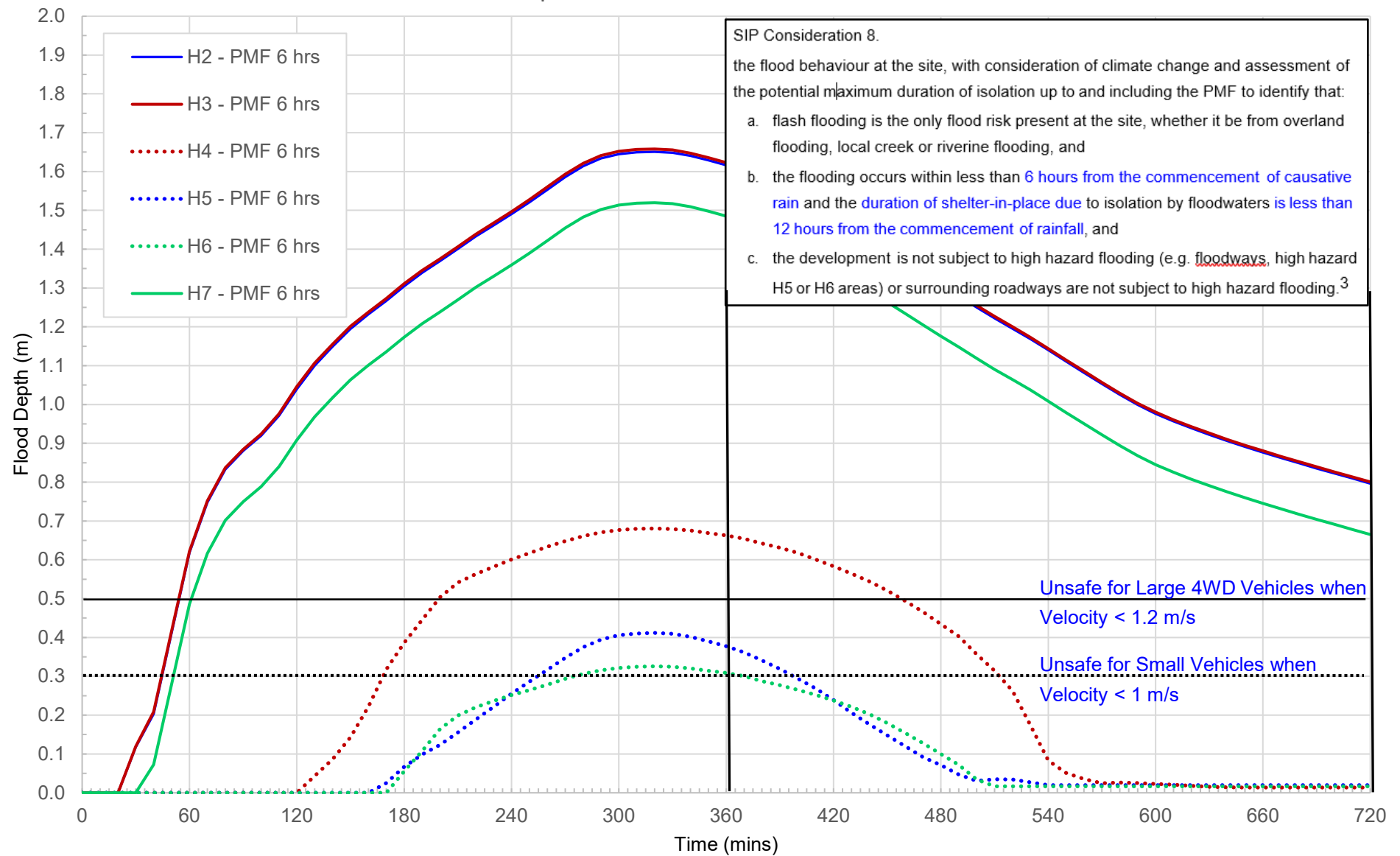
Flood Depths - 1% AEP in 2050



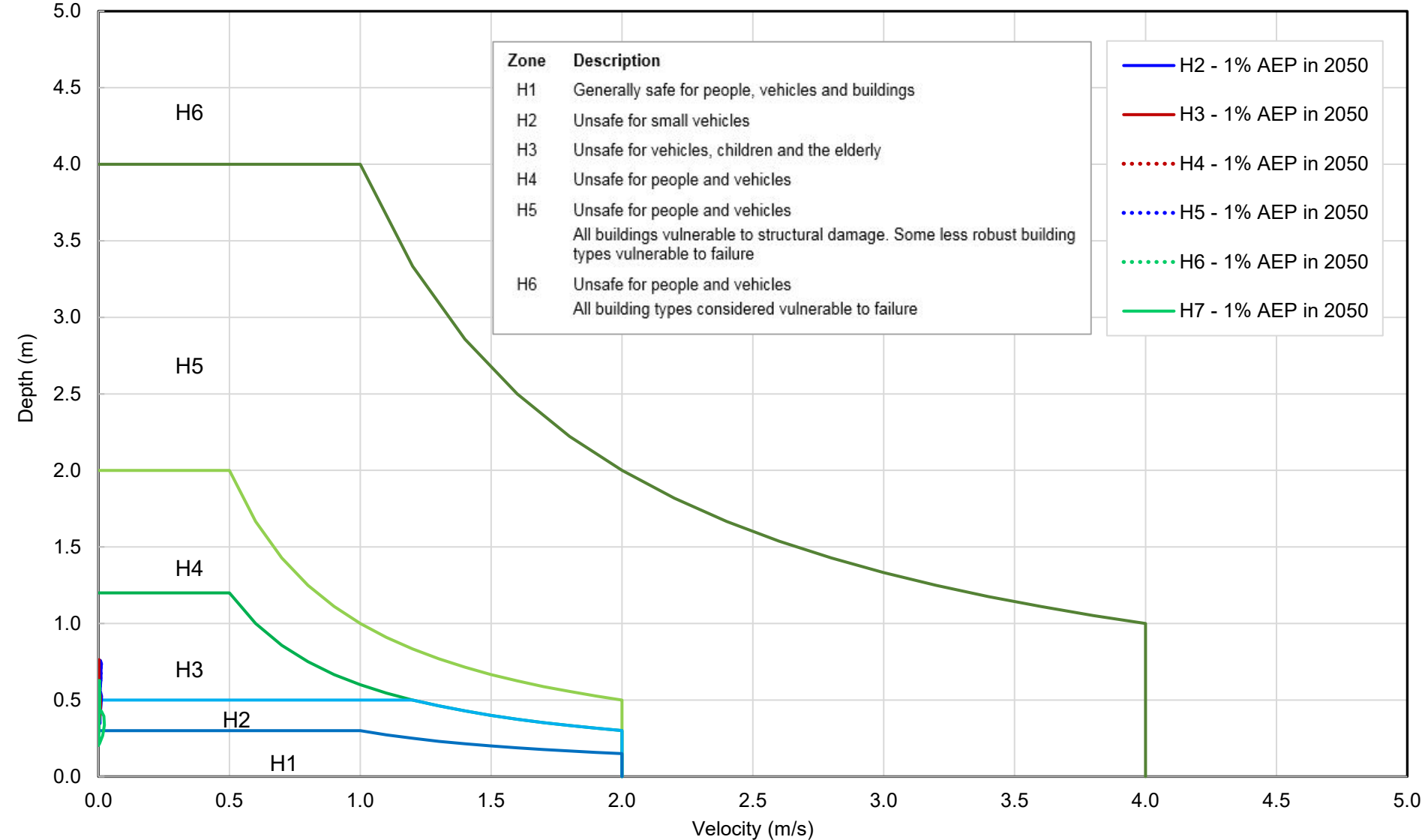
Flood Depths - PMF 4 hrs



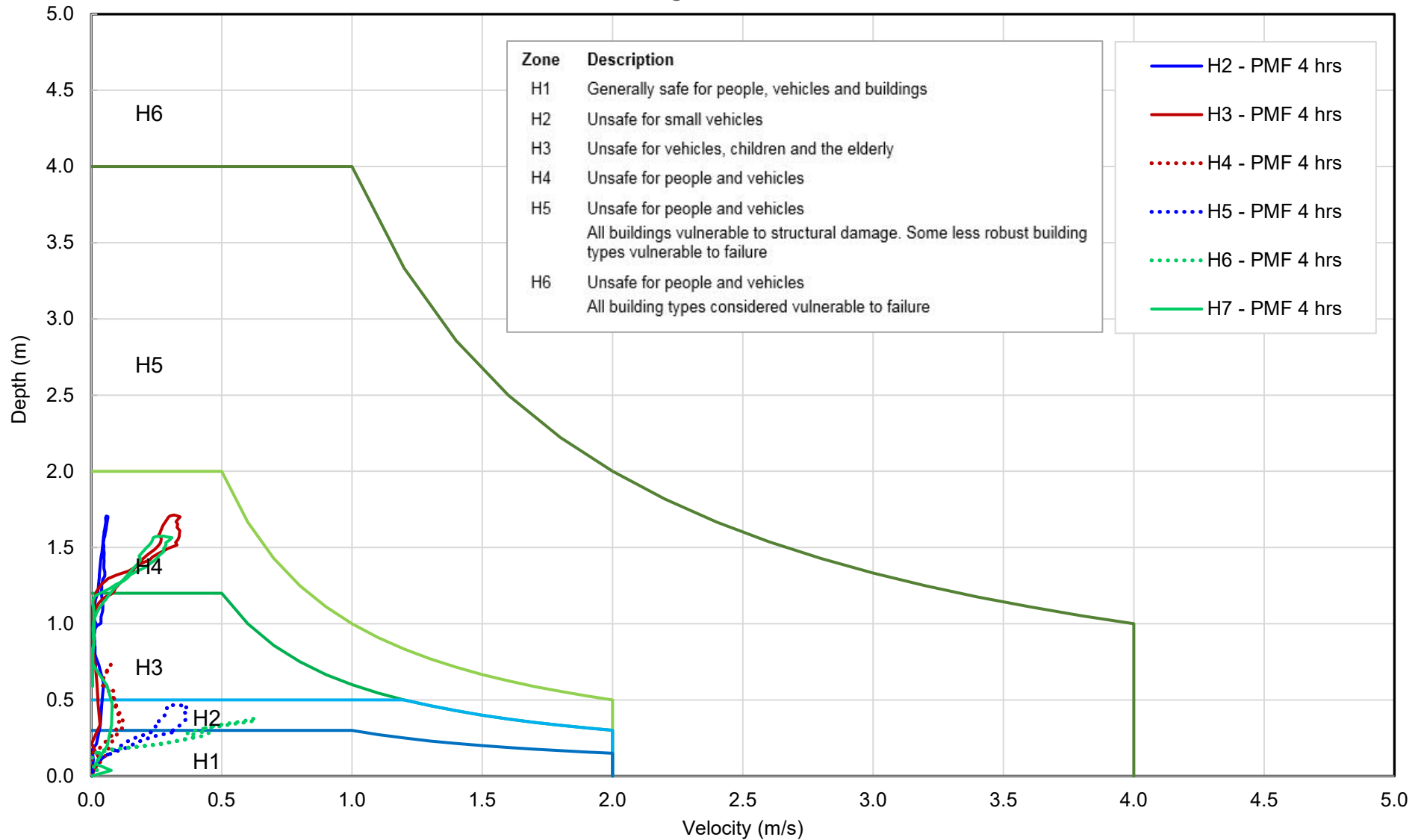
Flood Depths - PMF 6 hrs



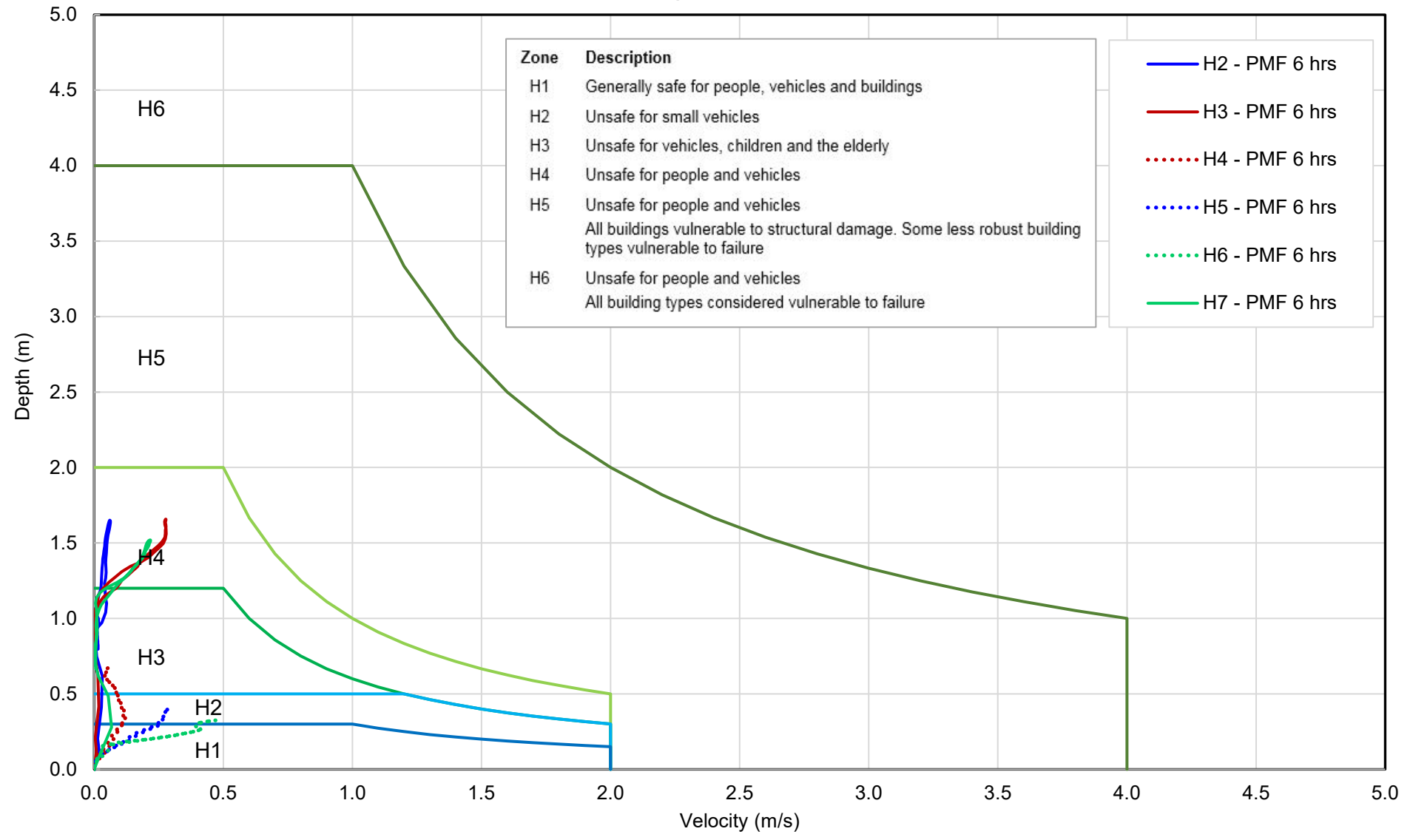
Hazard Categories - 1% AEP in 2050 Flood



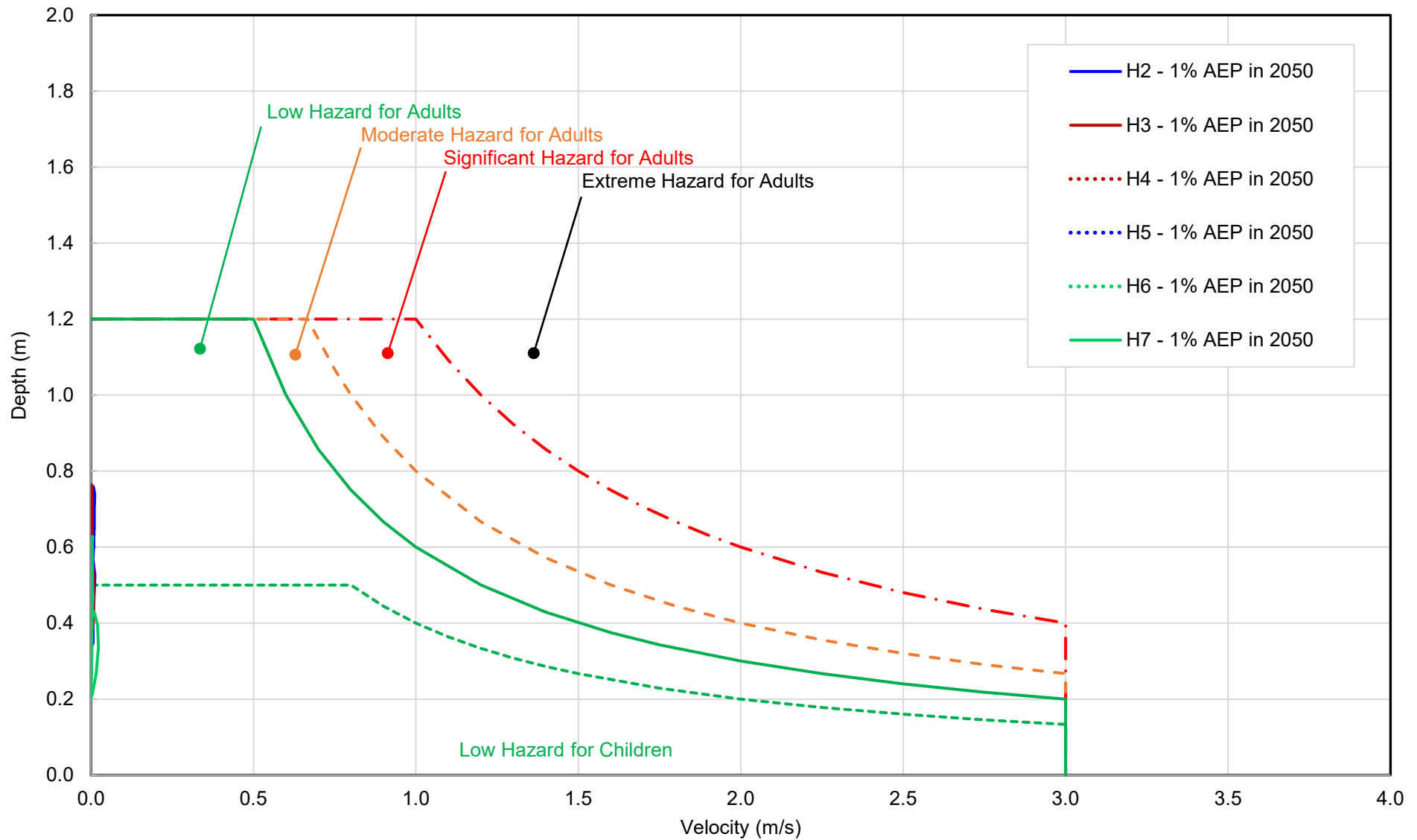
Hazard Categories - PMF 4 hrs



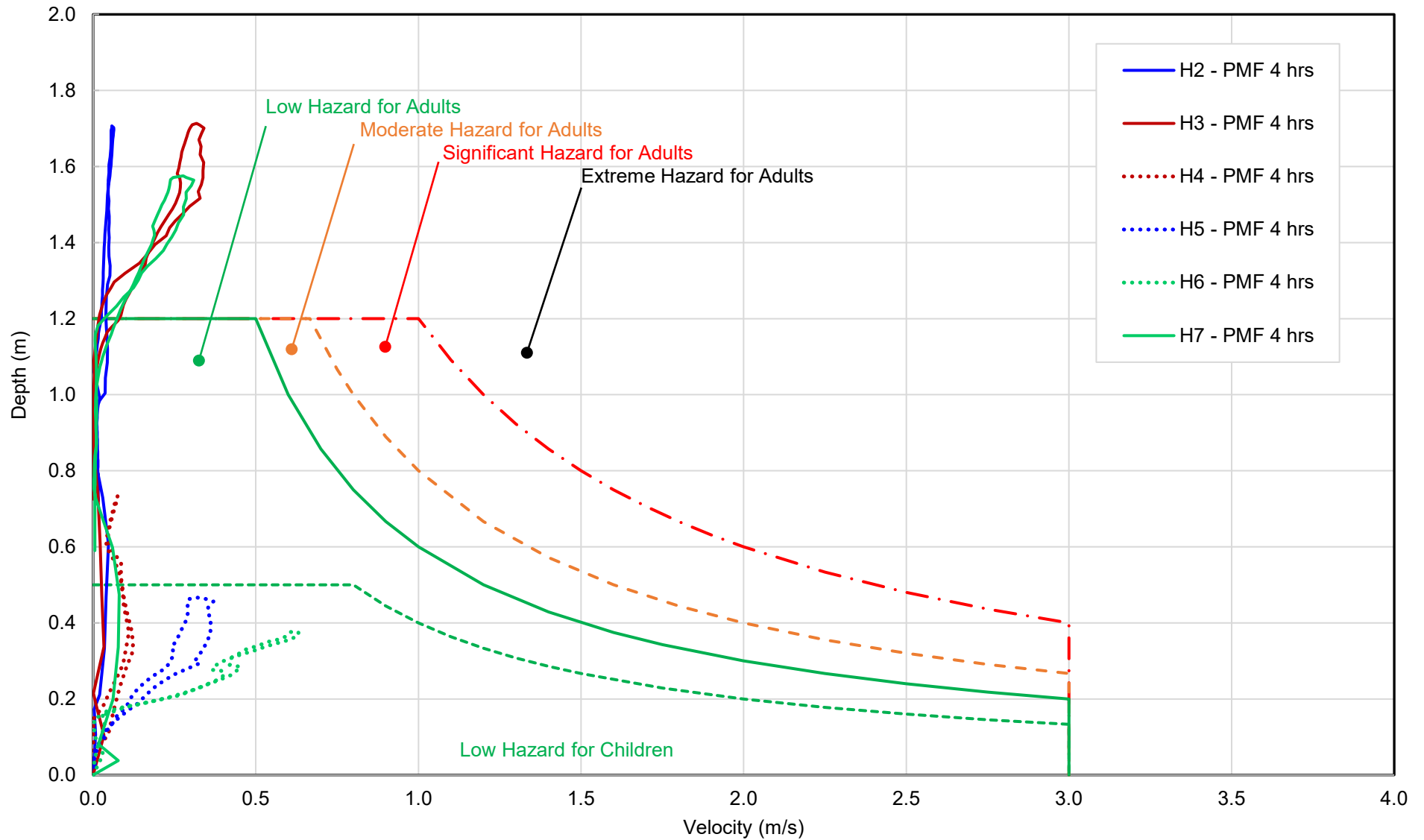
Hazard Categories - PMF 6 hrs



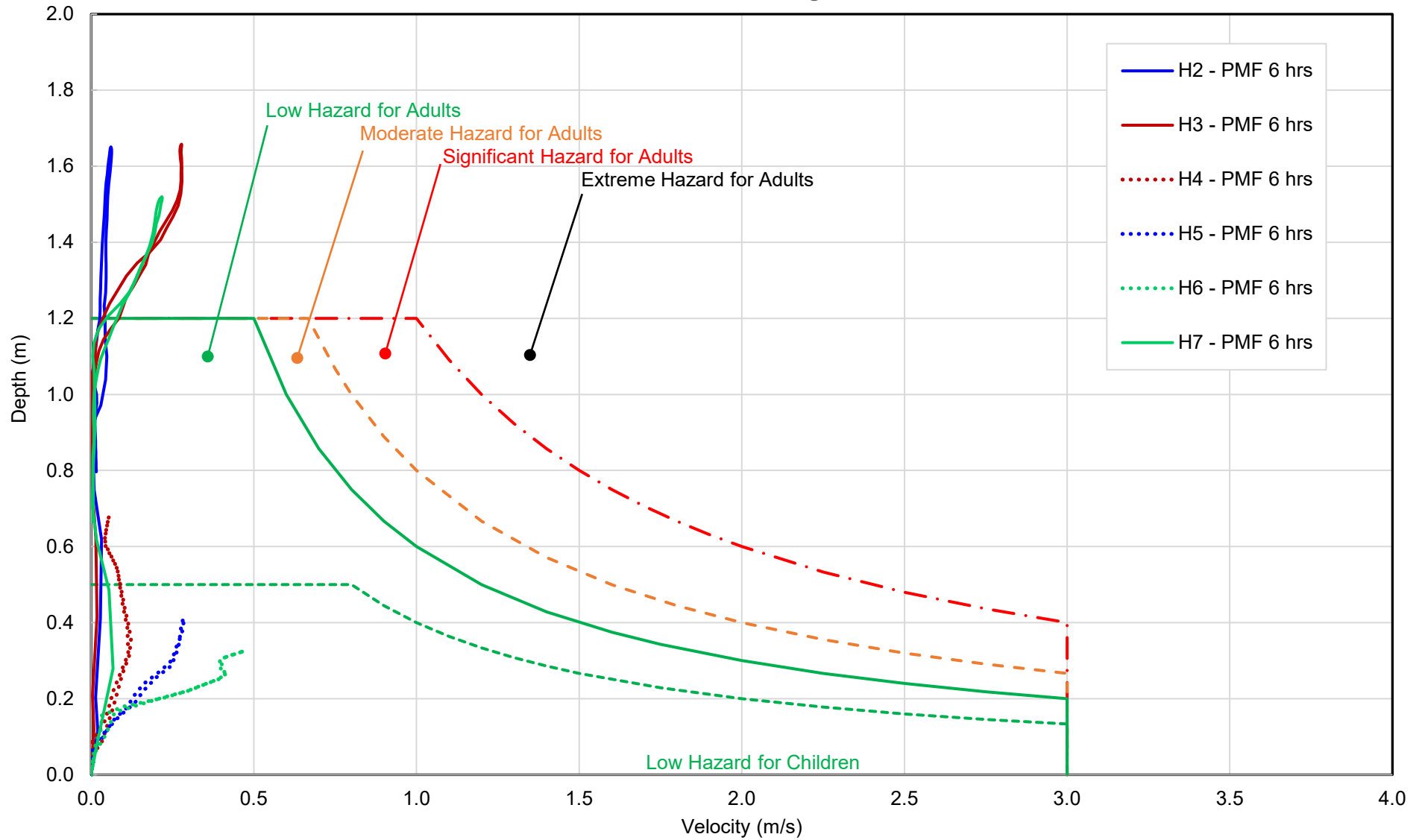
Pedestrian Hazard Categories - 1% AEP in 2050 Flood



Pedestrian Hazard Categories - PMF 4 hrs



Pedestrian Hazard Categories - PMF 6 hrs



Appendix G 2022 FERP





Document: Flood Emergency and Evacuation Plan Report

Project: Newcastle Bowline

Location: 10 Dangar Street, Wickham NSW 2293

Revision: B

Date: 28/05/2024

Project Reference: 22721

Prepared for: Eastern Pacific



Document Title	Flood Emergency and Evacuation Plan Report
Project	Newcastle Bowline
Project Address	10 Dangar Street, Wickham NSW 2293
Client	Eastern Pacific
Document version	B
Date	28/05/2024
Epicentre Project Reference	22721

Document Version Control					
Rev	Date	Description of Release	Prepared By	Reviewed By	Approved By
B	28/05/2024	Preliminary Issue	MM	LJ	LDG
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1. INTRODUCTION

Epicentre Consulting Engineers has been engaged to prepare a Flood Emergency Response Plan (FEMP) for the mixed-use development at 10 Dangar Street, Wickham (Lot 1 DP1197377). The development consists of 3 levels of commercial space and 97 residential units. The site area is approximately 2,904m² and enjoys frontage to Charles Street, Dangar Street and Hannell Street, refer Figure 1-1:



FIGURE 1-1 - SITE LOCALITY PLAN (SOURCE: HUNTER WATER SEE)

1.1. REPORT SCOPE

This report has been prepared to address conditions 13 of the Development Consent 2018/01197.02 refer below:

13. An appropriate flood emergency response plan is to be prepared by independent consulting engineers, experienced in flood management and put in place by the applicant prior to occupation of this site for the intended use. Such plan is to be effectively updated and maintained by the occupiers; to include an education and awareness component for the workforce and detailed evacuation procedures to interface with the Bureau of Meteorology's flood warning system and the local State Emergency Services plan (where appropriate) and to include provisions for any third parties likely to be involved.

A flood emergency response plan is to describe the following components:

- a) Likely flood behaviour
- b) Flood warning systems
- c) Education awareness program
- d) Evacuation and evasion procedures
- e) Evacuation routes and flood refuges and
- f) Flood preparedness and awareness procedures for residents and visitors

Considerations should include the full range of flood risks, the proposed use of the site, site access constraints and local area evacuation routes to high ground. As much as possible, the plan is to be aimed at self-directed evacuation or evasion to minimise the draw on limited State Emergency Services resources. Full details are to be included in documentation for a Construction Certificate application.

FIGURE 1-2 - EXCERPTS FROM CITY OF NEWCASTLE DEVELOPMENT CONSENT DA2018/01197

This plan is not a certification of the building works, compliance with minimum flood heights or sufficiency of the flood mitigation system/s installed. This report outlines the general process that needs to be undertaken to ensure the site is prepared for a regional flooding event.

1.2. REFERENCE DOCUMENTS

The following documents have been referenced in the creation of this plan:

- City of Newcastle, Flood Certificate Number FL2018/00245
- NSW SES, Your next steps to towards recovery from floods and storms
- City of Newcastle and NSW SES, City of Newcastle Emergency Sub Plan, Volume 1 2013
- BMT WBM, Newcastle City-wide Floodplain Risk Management Study and Plan, June 2012

1.3. EMERGENCY CONTACTS

Agency	Contact Details
NSW State Emergency Service (SES)	000 (life threatening emergencies) 132 500 (emergency assistance for flood/storm) https://www.facebook.com/NewcastleSES (NSW SES Newcastle Unit) https://www.ses.nsw.gov.au/ https://www.ses.nsw.gov.au/disaster-tabs-header/flood/ 75 Elizabeth Street, Newcastle
Bureau of Meteorology	1300 659 218 (NSW weather warning service) http://www.bom.gov.au/nsw/warnings/ (NSW warnings) http://www.bom.gov.au/nsw/flood/newcastle.shtml (Latest River heights)
Fire and Rescue NSW	000 (emergency) (02) 4927 2520 (Newcastle Fire Station)
Police	000 (emergency) (02) 4929 0999
Ambulance	000 (emergency)
City of Newcastle	(02) 4974 2000 https://newcastle.disasterdashboards.com/ https://www.facebook.com/CityNewcastle.au/ https://www.newcastle.nsw.gov.au/flooding
Road Closures	RMS - 132 701 https://www.livetraffic.com/ https://newcastle.nsw.gov.au/about-us/news-and-updates/road-closures (road closures)
Australian Broadcasting Corporation (ABC) – Emergency Broadcaster	1233AM – ABC Newcastle 95.9FM – ABC Newcastle (Port Stephens)
Other Agencies	Water NSW https://realtimedata.watarnsw.com.au/ (River Height) Manly Hydraulics Laboratory https://www.mhl.nsw.gov.au/ (Tide and River Height)

2. FLOOD LEVELS

Based on the flood certificate issued by the City of Newcastle (APPENDIX A) the following flood levels can be expected for the site:

Table 2-1 - Predicted Flood Levels for the Site

Flood Event	Flood Level (m AHD)	Description
1% AEP	2.20m	There is a 1% chance of this flood occurring in any one year
PMF	3.40m	Probable Maximum Flood – extreme flood with a very low probability of occurring. It could potentially have devastating effects, with significant loss of life and major damage to property and infrastructure.

The relative levels of the ground floor of the building are outlined in Table 2-2 below:

Table 2-2 - Building Floor Levels

Area	Floor Level (m AHD) Approx.	Source
Ground Floor Retail	Retail 1&2 - 2.68m Retail 3&4 - 2.80m	Architectural Plan - AR1003
Ground Floor Office Lobby	2.80	Architectural Plan - AR1003
Ground Floor Substation	2.30	Architectural Plan - AR1003
Ground Floor Residential Lift Lobby	2.80	Architectural Plan - AR1003
Ground Floor Gas Meter Room	2.68	Architectural Plan - AR1003
Basement 1 – Main Switch Room	-1.00	Architectural Plan - AR1002
Basement Ramp RL	2.68	The level at which water will spill into the basement – AR7301

3. LIKELY FLOOD BEHAVIOUR

The Newcastle City Wide Floodplain Risk Management Study and Plan (FRMS, WBM 2012) identifies three flooding scenarios that may affect the site. These are:

- Flash Flooding
- River Flooding
- Ocean Flooding

The FRMS also notes that two or more the above flooding events may occur simultaneously. To help facilitate flood risk management the FRMS has defined the following flood warning time categories for Newcastle:

TABLE 3-1 - FLOOD WARNING TIME CATEGORIES (SOURCE: NEWCASTLE FRMS)

no effective warning	<1 hr from onset of major rainfall	No time for pro-active and systematic organisation of flood mitigation, evacuation, emergency response etc. Individuals would be self-directed in regards to emergency response.
minimal warning	1-6 hrs from onset of major rainfall	Limited assistance and direction likely from emergency services and combat agencies. Measures requiring minimal time for implementation may be appropriate for flood management.
moderate warning	6-12 hrs from onset of major rainfall	Assistance and direction likely from emergency services and combat agencies, depending on time of day. Measures requiring moderate time, or less, for implementation may be appropriate for flood management.
good warning	12+ hrs from onset of major rainfall	Significant assistance and direction from emergency services and combat agencies can be expected, including assistance with evacuation. Most measures requiring some form of on-demand implementation would be appropriate for flood management.

3.1. FLASH FLOODING

This flood event is caused by intense localised rainfall over the City of Newcastle Catchment. These events are very quick to develop with no effective or minimal effective warning available. Based on the predictions outlined in the FRMS a period of approximately 150-180 minutes could be expected for a flash flooding to reach its peak (refer Figure 3-1).

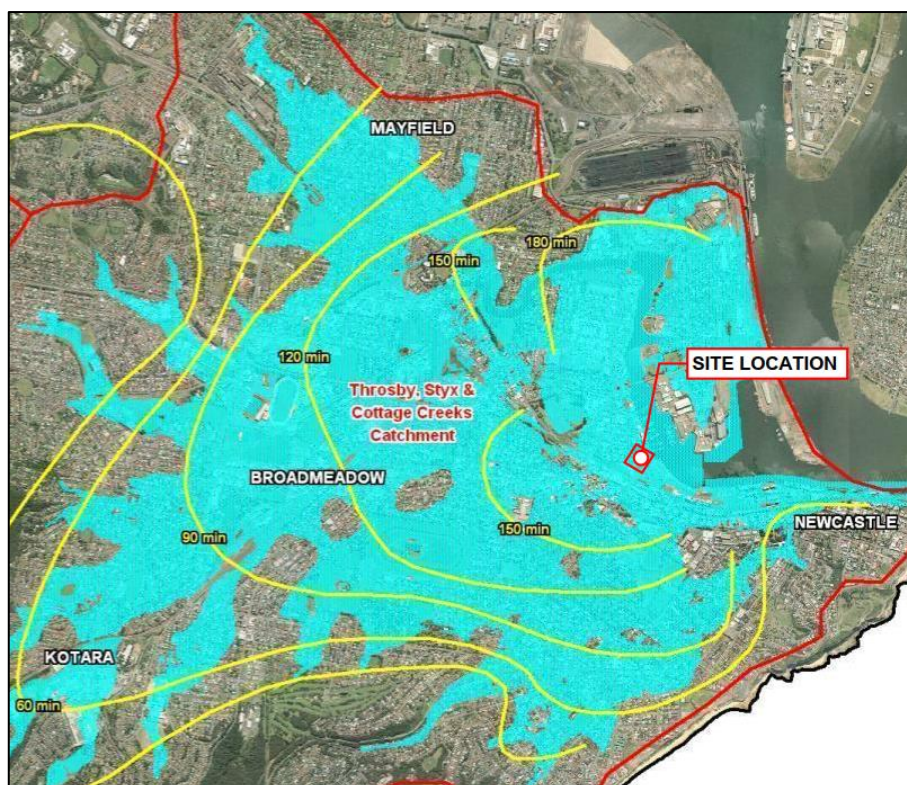


FIGURE 3-1 – APPROX. TIME TO REACH PEAK FLASH FLOODING CONDITIONS (SOURCE: TABLE 3-11 FRMS)

3.2. RIVER FLOODING

River flooding occurs following significant and persistent rainfall in the greater Hunter River Catchment. Given Newcastle is located at the downstream end of the Hunter River flooding is expected to have good warning time (in the order of days)

3.3. OCEAN FLOODING

Ocean flooding of Newcastle is dependent of the astronomical tide. As this is the case the peak of ocean flooding is somewhat predictable (to occur around the peak of a high tide). Meteorological factors that elevate normal tide levels (eg storm surge) are generally observed over timeframes of 12 hours or more. Therefore warning timed for ocean flooding can be expected to be moderate to good (6 hours+).

4. FLOOD WARNING SYSTEMS

Flood warnings for Newcastle are available from several sources including:

- ABC – Emergency Broadcaster
- NSW SES
- City of Newcastle

The contact details for each of these organisations is outlined in Section 1.3 above. In addition to these services the City of Newcastle runs a free flood alert service for registered participants. Registration for this service can be undertaken by completing a simple form at the following link:

<https://www.newcastle.nsw.gov.au/floodalert>

It is recommended that residents, workers and regular visitors to the site are registered with the City of Newcastle flood alert service.

4.1. FLOOD WARNING AND EVACUATION TIMEFRAMES

The City of Newcastle flood alert service will issue 3 alert levels being:

- **Minor Flood Warning** – is to inform there is potential for flooding in the area. Watch the situation and prepare for flooding with your emergency kit (refer Section 5.1.5)
- **Moderate Flood Warning** – is to inform there is moderate potential for flooding. Stay indoors unless an evacuation order is issued. Never drive, ride or walk-through floodwater.
- **Major Flood Warning** – is to inform there is major potential for flooding. Stay indoors unless an evacuation order is issued. Never drive, ride or walk-through floodwater.

Alerts via 3 methods that can be selected at the time of registration (SMS, Email and Automated Voice Message). Each alert gives potential conditions in the local area, potential flood conditions and recommended actions.

The time available to prepare for, provide warnings and carry out an evacuation can vary depending on the type of flooding event outlined above. Once an alert is received there may be limited time to respond, flooding may already be occurring.

Once an alert is received you should commence preparing by locating your emergency kit (refer Section 5.1.5), turning on local radio (refer Section 1.3) and follow the advice of the SES.

4.2. EVACUATION AND EVASION PROCEDURES

As outlined above it is recommended that resident's shelter in place on level 2 (see figure 4.1) until an evacuation order is issued by the SES. The City of Newcastle Local Flood Plan identifies the following locations may be suitable for use as evacuation centres:

- Adamstown RSL, Brunker Road, Adamstown
- Bar Beach Bowling and Sporting Club, Kilgour Avenue, Merewether
- Beresfield Bowling Club, Anderson Drive Beresfield
- **Newcastle Panthers, King Street, Newcastle**
- Wests League Club, Hobart Road, New Lambton

Of the potential evacuation centres outlined above the Newcastle Panthers is the closest to the site.

Prior to evacuating it is recommended the operation and location of evacuation centres is confirmed with the SES.

To help aid in your evacuation the Risk to life on Roads maps for the local area have been included in Appendix C. These maps outline the potential depth of flooding on the Newcastle Road Network.

Do not walk or drive into floodwater, especially where a current exists, even if the water appears to be shallow. If you are trapped by rising floodwaters, seek refuge above the flood waters (note all levels except the ground floor are above the PMF level).

When leaving or evacuating your property, place in your emergency kit (refer Section 1.3):

- A good supply of required medications
- Any special requirements and supplies for babies, the disabled, infirm and/or elderly
- Appropriate clothing and footwear
- Fresh food and drinking water
- Keep your emergency kit in a waterproof storage container.

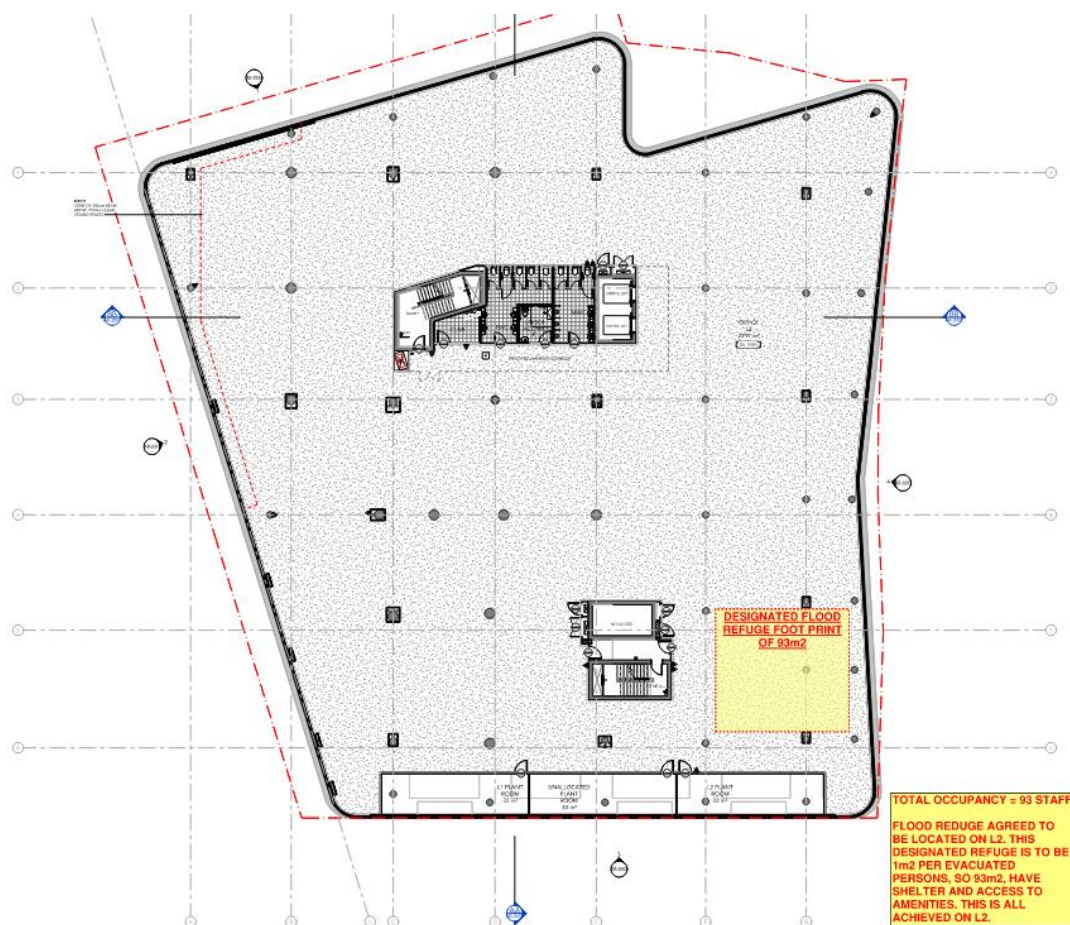


FIGURE 4-1 – DESIGNATED FLOOD REFUGE FOOTPRINT ON LEVEL 2

5. FLOOD PREPARATION AND EDUCATION

It is recommended this section of the report is revised prior to occupation once the management arrangements of the site have been established

5.1. OPERATION OF THE SITE

It is understood that the site will consist of 3 separate uses being:

- Ground Floor Retail
- Commercial Offices
- Permanent Residential Units

A description of each use is outlined below

5.1.1. RETAIL

This consists of 4 premises that are located on the ground floor.

5.1.2. COMMERCIAL

The commercial component is spread across 3 floors (Levels 1-3) of the building. It is anticipated that each tenant will be a long term established business.

5.1.3. RESIDENTIAL

This consists of 97 units occupied by either owner occupiers or long-term tenants. These units are located across floors 4-17.

5.1.4. MANAGEMENT

It is understood that the premises will be managed by a Strata Manager. It is unclear at this stage about the extent of onsite management or security.

5.1.5. EMERGENCY KIT

An Emergency Kit can help save precious time in an emergency situation. It provides items that might be needed if power is lost or it is necessary to leave your home or workplace in a hurry. It is recommended that each retail tenancy, commercial tenancy, and residential unit has an emergency kit onsite. The emergency kit should be stored in a waterproof container and its contents include:

- Portable radio with spare batteries
- Torch with spare batteries
- First aid kit (with supplies necessary for your household)
- Candles and waterproof matches
- Important papers including emergency contact numbers
- Copy of any Emergency Plans
- Waterproof bag for valuables

Emergency kits should be checked on a regular basis (remember to check use-by dates on batteries and gloves) and restock items if you need to. Keep a list of emergency numbers near your phone or on your fridge refer Section 1.3.

For more information please visit the SES website:

<https://www.ses.nsw.gov.au/floodsafe/prepare-your-home/emergency-kit/>

5.2. RESPONSIBILITIES

In the absence of a permanent building manager the following responsibilities for implementing the Flood Emergency Response Plan are suggested for the site:

- Retail Tenancies – Store Manager/s
- Commercial Tenancies – Office Manager / Fire Warden
- Residential Units – Strata Manager and Residents

Each of the parties listed above are responsible for maintaining a current list of emergency contact details for all people under their supervision. Emergency contact lists are to be stored in an easily accessible location.

The building strata manager will be responsible for maintaining a copy of the most recent plan, updating the plan as required and communicating any updates to the parties listed above.

5.2.1. AWARENESS PROCEDURES

All residents and workers shall be provided with a copy of the FEMP and provided with assistance in understating the plan as necessary. As a minimum the following triggers are suggested for implementing awareness of this Flood Emergency Response Plan.

Building Element	Trigger	Person Responsible
Residential Tenants	Upon Residents moving into the building Updates of the FEMP being issued	Strata Manager Strata Manager
Retail / Office Staff	Staff Commencing Employment at the site Updates of the FEMP being issued	Store / Office Manager Store / Office Manager
Visitors	Upon arrival as appropriate	Visitor's Host

TABLE 5-1 - FERP AWARENESS RESPONSIBILITIES AND TRIGGERS

5.3. IMPLEMENTATION AND REVIEW

The Strata / Site Manager will maintain the currency of this plan by:

- Ensuring that all residents, organisations and officers mentioned in it are aware of their roles and responsibilities
- Conducting exercises / inductions to test arrangements
- Reviewing the contents of the plan:
 - After each flood event
 - When significant changes in land-use or community characteristics occur
 - When new information from flood studies become available
 - When flood control or mitigation works are implemented or altered
 - When there are changes that alter agreed plan arrangements
- The plan is to be reviewed no less frequently than every five years

5.4. FLOOD ACTION PLAN

The following table is designed to help inform your response to a flooding event

Phase	Trigger	Consequence	Monitoring / Liaison	Actions
Prepare	All the time	N/A	- Register for the City of Newcastle flood alerts - Install weather apps such as BOM weather - Bookmark important websites such as the City of Newcastle Disaster Dashboard - Follow important information sources on social media such as Newcastle SES, City of Newcastle, and Local ABC	- Maintain the FERP and awareness program - Assemble and maintain an emergency kit
As the Flood Approaches	Flood warning issued by the SES	Potential for the site to be isolated	- Monitor Bureau of Meteorology (BOM) forecasts and warnings, listen to the local ABC radio stations	- Tell tenants, staff, customers and visitors that are away from the premises to remain away from the premise during flood, until advised that flood waters have receded. - Notify staff and customers of alternative business arrangement if necessary. - Find, check and have Emergency Kit readily available. - Residents requiring 24/7 access to hospital, or who otherwise cannot tolerate isolation to evacuate as their situation requires.
Immediately Before and During the Flood	Floodwaters inundate local area	Danger from direct flooding	Continue to monitor ABC Radio, SES alerts and the Bureau of Meteorology forecasts and warnings.	- Shelter in place until instructed to evacuate as directed by the SES - Seek higher ground or safety as required - Never drive, ride or walk-through floodwater - Check on staff members and neighbours
After the Flood has passed	Flood Threat Over. NSW SES Hunter Region Incident Controller or the NSW SES City of Newcastle Local Incident Controller will issue an 'all clear' message signifying that response operations have been completed.	Flooding threat over	Continue to monitor ABC Radio, SES alerts and the Bureau of Meteorology for information, updates and advice	- Follow the NSW SES Recovery Guide to returning to site (Appendix D) - Return when safe to do so - Before re-occupy the premises, undertake an OH&S risk assessment. - Review and update this FEMP after every significant flood event

APPENDIX A – FLOOD CERTIFICATE

APPENDIX B – ARCHITECTURAL PLANS

Drawing Number:	Title:
918-AR-1002	Basement 1 GA
918-AR-1003	Ground Floor GA
918-AR-7301	Ramp Details 2

APPENDIX C – RISK TO LIFE ON ROAD FLOOD MAPS

APPENDIX D – NSW SES FLOOD RECOVERY GUIDE



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Communities are fundamental. Whether around the corner or across the globe, they provide a foundation, a sense of place and of belonging. That's why at Stantec, we always design with community in mind.

We care about the communities we serve—because they're our communities too. This allows us to assess what's needed and connect our expertise, to appreciate nuances and envision what's never been considered, to bring together diverse perspectives so we can collaborate toward a shared success.

We're designers, engineers, scientists, and project managers, innovating together at the intersection of community, creativity, and client relationships. Balancing these priorities results in projects that advance the quality of life in communities across the globe.

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